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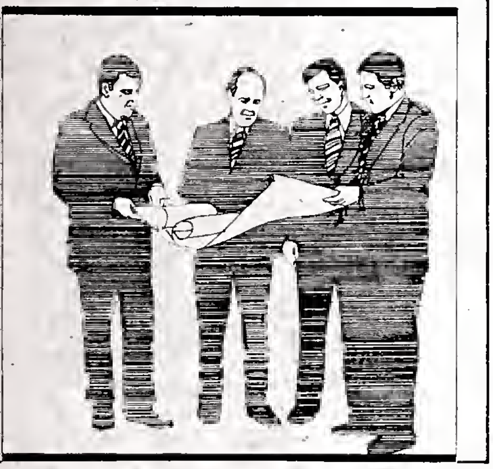
SPECIAL REPORT

Inside — Unraveling the Complexities Of Data Communications Networks



NAS Challenges IBM 3080s By Expanding AS/9000 Line

By Jeffry Beeler
CW West Coast Bureau

MOUNTAIN VIEW, Calif. — National Advanced Systems, Inc. (NAS) last week expanded its high-end AS/9000 processor line with the introduction of three additional mainframes that reportedly provide about 10% more performance than their IBM 3080 series counterparts for prices that are roughly 20% to 30% lower.

The three latest NAS machines are the AS/9040, which belongs in the same product class as the IBM 3083B; the AS/9050, which competes directly with the 3083J; and the AS/9070, which compares roughly to the 3081K.

Each of the AS/9000 additions already provides hardware and software compatibility with the 3080 series processor family in the IBM 370 mode and will eventually be able to support the industry giant's Extended Architecture (XA) as well, according to a NAS spokesman. An optional XA capability is tentatively scheduled to be made available with the AS/9000 mainframes during the first quarter of 1984.

In the 370 series XA mode, the 3080-series-class NAS machines will reportedly be able to support 31-bit addressing and the XA Migration Aid for IBM's VM operating system. The XA option will also allow the AS/9000 mainframes to support MVS/SP Version 2 and its related program products, the spokesman said.

Five AS/9000 Models

With the introduction of the AS/9040, 9050 and 9070, the AS/9000 family now consists of five models. The processor line's two other members include the AS/9060, which corresponds roughly to the IBM 3081G, and the AS/9080, which competes primarily with the 3084.

Each of the latest 9000 machines is field-upgradable to its next largest sister product, the spokesman said.

Between the entry-level AS/9040 and the top-of-the-line AS/9080 lies a 300% difference in computing power,

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CW at Software/Expo

New Products Steal Show

By Susan Blakeney
CW Staff

CHICAGO — A myriad of new software products and enhancements highlighted the Software/Expo show here last week.

MSP, Inc. unveiled Designmanager, a dictionary-driven interactive data and information modeling tool for automating modeling and logical data base design. Developed for IBM and plug-compatible mainframes under OS and DOS, Designmanager features comprehensive control facilities, memory management, checkpoint and restart capabilities, audit trails and flexibility and reportedly interfaces to most teleprocessing monitors.

Designmanager is available immediately. For OS sites, its price range is $17,800 to $26,400; the DOS version costs $10,680 to $15,840. MSP is located at 131 Hartwell Ave., Lexington, Mass. 02173.

Integrated Software Systems Corp. (Issco) introduced a family of four products that reportedly link computer data sources to its Tell-A-Graf computer graphics software. Called File Connection, Report Connection, External Program Connection and Decision Support Connection, these products will be available Oct. 1 to users of IBM systems under MVS or CMS and Digital

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Prime Brings Out OA Supermini Boasting Power of VAX-11/730

By Tim Scannell
CW Staff

NATICK, Mass. — Prime Computer, Inc. last week extended its 32-bit minicomputer line further into the office automation market by introducing a compact low-end system that features up to 4M bytes of main memory and up to 316M bytes of online disk storage.

Aimed at distributed office functions, the Model 2250 supermini can support up to 32 terminals in an interactive local environment and reportedly handles up to 128 simultaneous operations. Prime claimed the 2250 is as powerful as Digital Equipment Corp.'s VAX-11/730 supermini and a little less powerful than its own low-end Series 50 Model 250-II supermini. However, it is said to be about 50% less expensive than a similarly configured 250 computer.

The newly introduced PST100 terminal offers line-drawing and block graphics capabilities for the business user.

At the same time, Prime announced:

- Plans for Prime/SNA, a software facility that will support both interactive and remote job entry users by allowing Prime systems to communicate via IBM's Systems Network Architecture (SNA). The facility will be accessed via a number of "gateways" embedded in the firm's Primenet communications network, a spokesman said.
- An intelligent, alphanumeric display terminal, the Prime System Terminal (PST) Model 100, which is the first terminal totally designed and produced by the minicomputer maker.
- A variety of software, including an updated version of the Primos operating system software, two program compilers, a screen editor and a newly developed software facility that handles file forwarding and batch storing to remote systems (story on Page 9).
- Enhanced field service options that guarantee a sys-

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CW at SMIS

Budget Cuts Hitting DP

By Marcia Blumenthal
CW Staff

CHICAGO — Because of today's spotty economy, management information systems (MIS) departments for the first time are facing the prospect of budget cuts.

"We've had to join our companies, finally," observed Norman H. Carter, president of Development Systems International. A featured luncheon speaker at the 14th annual conference of the Society for Management Information Systems, Carter suggested that weak economic conditions are a good reason for managing human resources more effectively.

If an MIS department re-

(Continued on Page 10)

CW at TCA

Muxes Dominate Show

By Bruce Hoard
CW Staff

SAN DIEGO — Statistical multiplexers were among the most numerous of new products introduced at the Telecommunications Association (TCA) show here last week.

Infotron Systems Corp. unveiled its Supermux Models 616 and 632, which feature 16 and 32 channels, respectively. The microprocessor-controlled units are said to guide an untrained user through system programming and testing with English-language prompting

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Working Hard Within IEEE 802

IBM Endorses Ring-Type Local Net

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — IBM, which has ignored local-area networks until recently, officially endorsed a specific local-area network architecture here last week.

The endorsement came in a keynote speech delivered by Victor J. Goldberg, president of IBM's Communications Products Division, at the Compcon Fall '82 Conference, held here last week by the Institute of Electrical and Electronics Engineers (IEEE) Computer Society.

Goldberg reported in his speech that IBM is working hard within IEEE's 802 Committee to develop standards for ring-type local-area networks that employ baseband transmission and token passing. The big advantage of ring systems is the applicability of fiber optics to this topology, according to Goldberg.

"Fiber optics can support the higher speeds and longer drive distances, which we anticipate will be required before the end of this decade," he said, adding that "data rates in the range of 30M bit/sec at distances greater than one kilometer can readily be achieved."

CW at Compcon

Digital baseband transmission is cheaper than analog broadband because no radio frequency modem is required, Goldberg said. Moreover, "the cost of digital technology is dropping much faster than that of analog."

IBM favors token passing because it "provides predictable and controllable access delay," enables the system designer to predict average and worst-case performance of an attached product and allows assignment of transmission priorities to each station, according to Goldberg.

COMPUTERWORLD OA

Watch for the third issue of Computerworld OA *to appear in your mailbox this week. The issue is packed with suggestions on how to ease the transition to the automated office for staff and management through information centers, organizational planning and cost analysis.*

IBM vs. Bridge Tech Suit Put on Hold Until Oct. 20

WHITE PLAINS, N.Y. — A Sept. 20 hearing on the trade secrets theft case brought by IBM against Bridge Technology, Inc. was adjourned until Oct. 20 by Westchester County Supreme Court Judge Theodore A. Kelly.

An IBM spokesman said the adjournment was granted to allow attorneys for Bridge Technology to prepare for the case.

IBM filed suit Sept. 13 charging Bridge Technology and three former high-ranking IBM employees — Louis C. Eggebrecht of Rochester, Minn.; Peter J. Stearns of White Plains; and William W. Erdman of Stamford, Conn. — with attempting to sell secret design information relating to unannounced products for IBM's Personal Computer [CW, Sept. 20].

Kelly extended until the Oct. 20 hearing date a temporary restraining order prohibiting Bridge Technology and the three defendants from releasing IBM trade secrets.

Other events occurring at the Sept. 20 hearing were not available at press time because court records relating to the case were sealed, according to a spokeswoman in the Westchester County Clerk of Courts Office.

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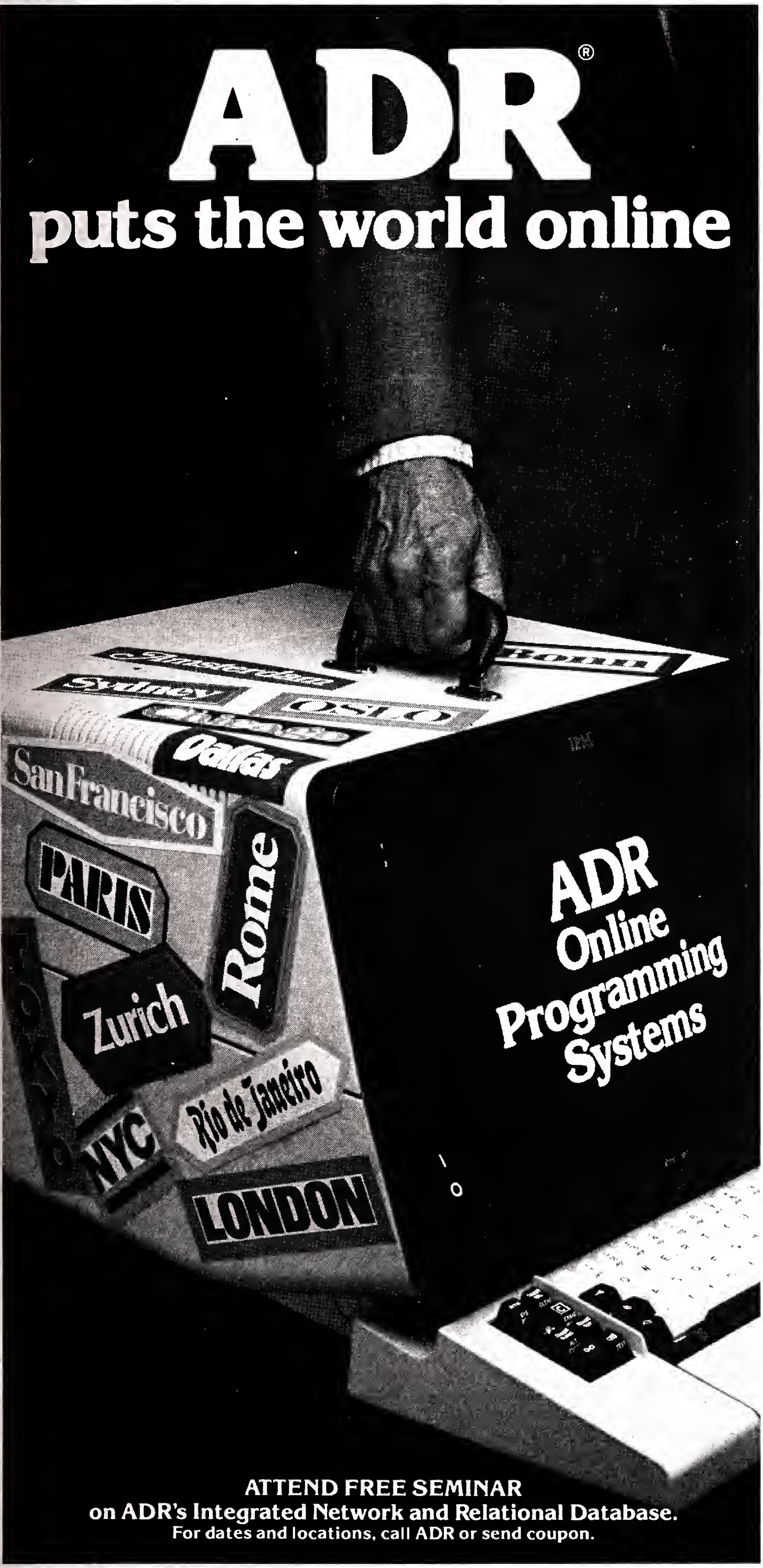

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CW9/27

IBM Slaps Suit on Hitachi, National Semi, NAS

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — IBM has slapped Hitachi Ltd., National Semiconductor Corp. and its subsidiary, National Advanced Systems, Inc. (NAS), with a lawsuit stemming from an alleged Japanese plot to steal the industry giant's trade secrets.

The civil suit marks the first time National Semi and NAS have been named as defendants in a case in which two Japanese electronics firms allegedly conspired to transport stolen IBM technology from the U.S. to Japan.

Hitachi and two former NAS employees have already been indicted in connection with the alleged trade-secrets theft scheme, as have 20 other defendants. But until IBM filed its civil suit here Sept. 16, neither NAS nor its parent company had been formally accused of any wrongdoing in the case.

IBM's complaint charges the two American firms and Tokyo-based Hitachi with engaging in "unfair business practices" when they allegedly tried to "misappropriate" confidential product information describing IBM's 3080 series hardware designs, extended architecture, 3380 disk unit, 3880 disk controller and MVS/SP Version 2 operating system. The desired information would have been used by the defendants to develop and market a new generation of plug-compatible CPUs and peripherals that would compete with IBM's own, the suit contends.

Alleged efforts to steal proprietary IBM systems know-how constitutes "racketeering" and "unfair competition" and threaten to "cause [the company] irreparable injury," the suit adds.

The charges contained in IBM's complaint apply not just to Hitachi, NAS and National Semi, but to two other electronics companies and 16 Japanese businessmen as well. The two additional firms are Tokyo-based Nissei Electronics Ltd., an Hitachi affiliate, and NCL Data, Inc., a Santa Clara, Calif.-based consulting firm.

Absent from the IBM suit's list of defendants is the name of Mitsubishi Electric Corp., the other Japanese electronics firm recently indicted by the U.S. government on charges of conspiring to transport stolen IBM trade secrets.

Filed here in U.S. District Court, the suit seeks a preliminary and permanent injunction barring the defendants from developing and selling any computer equipment that incorporates IBM trade secrets or confidential business information. The suit also asks that the defendants cease disclosing and using IBM trade secrets and requests that the defendants return all the company's proprietary product technology.

In addition, the complaint seeks an unspecified sum in punitive and other damages and asks the district court to appoint a "Special Master" to inspect the defendants' premises and verify that all the allegedly stolen trade secrets have been returned to IBM.

NAS: IBM Trying to 'Intimidate' Rivals

MOUNTAIN VIEW, Calif. — In filing its recent civil suit against Hitachi Ltd. and two of its key U.S. business partners, IBM is using its legal expertise to "intimidate" and inhibit competitors it cannot outdo technologically.

That accusation comes from Floyd Kvamme, president of National Advanced Systems, Inc. one of five U.S. and Japanese electronics firms that were sued by IBM earlier this month for allegedly "misappropriating" the industry giant's trade secrets.

In an interview five days after the Sept. 16 court filing, Kvamme described the latest development in the ongoing Japanese industrial espionage drama as a "marketing case, not a trade secrets case." He also characterized the IBM suit as an application of "legal technology" aimed at striking "fear" into the hearts of customers who might be considering the purchase of IBM-compatible processors or peripherals.

"I don't think it's a coincidence that this lawsuit comes at a time when [NAS] has just completed its best month ever," Kvamme said. "There's no question that we're hurting IBM," which he said is now marshaling its formidable legal forces in an effort to launch a competitive counterattack.

The reason IBM has chosen to mount its assault in the courtroom rather than in the marketplace, Kvamme said, is simple: "IBM's legal technology is more state of the art than its computer technology."

Kvamme's sentiments were echoed by Dave Martin, NAS vice-president of communications, who blasted the IBM suit as "inflammatory." Martin pointed in particular to the complaint's apparent implication that NAS and other manufacturers of IBM-compatible computing equipment are merely technological parasites.

"Generally, [plug-compatible manufacturers] do not develop their own products; they do not innovate," the suit says. "Instead, they acquire IBM products, go through a process of reverse engineering and market functional copies of IBM's products. They are often able to charge prices lower than IBM's, in part because they incur much smaller research and development costs, or none at all, and avoid the substantial risks that IBM takes in developing and introducing new products."

"What the complaint says, in effect," according to Martin, "is that plug-compatible manufacturers are whores who copy IBM's technology and pay nothing for it."

Stat Muxes Dominate TCA Show This Year

(Continued from Page 1)

instructions and "Help" files displayed on any Ascii terminal.

The Supermux 616 costs $5,500 and the Supermux 632, $9,000, Infotron said from Cherry Hill Industrial Center, Cherry Hill, N.J. 08003.

Rixon, Inc. introduced the Commux four- or eight-channel statistical multiplexer and the R212 modem with autodial. The Commux has an integral 9,600 bit/sec communications interface module, which reportedly eliminates the need for a separate modem.

It provides error-free transmission for asynchronous data channels over a single synchronous composite link. It also provides an unrestricted intermix of speeds from 50 to 9,600 bit/sec and any 5-, 7- or 8-bit Baudot, Ascii or IBM code. It costs $4,690.

Coverage of the TCA show continues on Pages 14 and 15.

The R212 modem with Auto Dialer is a Bell-compatible, single-card large-scale integration design data modem with an auto dialer. It transmits and receives serial binary data full duplex over the two-wire Direct Distance Dialing (DDD) switched network. It costs $895 with Auto Dialer, $695 without, Rixon said from 2120 Industrial Pkwy., Silver Spring, Md.

The Comdesign, Inc. TC-500 statistical multiplexer concentrates both synchronous and asynchronous terminals and features programmable options that are usually found in high-end systems, the vendor claimed. All configuration changes at either end are automatically transmitted to the other end and stored in nonvolatile memory.

It displays selected channels' received or transmitted data, EIA signals, framing, parity and buffer overflow occurrences and utilization percentages. Prices for the TC-500 start at $1,700. Domdesign is based at 751 S. Kellogg Ave., Goleta, Calif. 93117.

Halcyon Communications, Inc. took the wraps off its low-end Model 4001 statistical multiplexer. The 4001 features user-selected channel priority (high, low or normal).

In-band and out-of-band flow controls are independently selected at each end of the channel for traffic balancing throughout a point-to-point network.

The 4001 starts at $1,690 for the four-channel version. Halcyon is lcoated at 2121 Zanker Road, San Jose, Calif. 95131.

Codex Corp. unveiled an electronic switch designed to automate testing and restoral at remote sites and a line of 9,600 bit/sec modems. The Model IMS 7760 switch comes with a software package called Device Oriented Control Software (Docs). With Docs, the switch is initially configured to "recognize" on-line vs. backup equipment. In a large network, up to 250 remote IMS 7760s can be controlled from a central site. Pricing begins at $8,000.

The new "E" series of 9,600 bit/sec modems is composed of the LSI E9600, LSI E9604 and LSI E9600 V.29. The modems are designed for users who want basic functionality without expensive options, the vendor said. The LSI E9600 costs $2,650, the LSI E9604 costs $3,200 and the LSI E9600 V.29 has a suggested price of $3,200, Codex said from 20 Cabot Blvd., Mansfield, Mass. 02048.

"It's Rathbone at the Tonga office, ready to have the IBM print out the leads and sell up a storm."

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After Three-Month FBI Investigation

Three Charged in Plot to Sell Modems to Soviets

By Bill Laberis
CW Staff

PITTSBURGH — A bankrupt plumber, the owner of a trucking company and a service manager for Racal-Milgo Information Systems, Inc. are free on bond following their arrest on charges they conspired to steal $3 million in modems and ship them to the USSR.

The Sept. 16 arrests capped a nearly three-month investigation by the Federal Bureau of Investigation that probed an alleged plot to steal the modems, conceal them in Greater Pittsburgh and funnel them — possibly through Mexico — to the Soviets.

According to a government source, the Soviets may be very interested in illicitly securing off-the-shelf items like modems, which underscores the impact of the U.S.-imposed embargo on a broad range of American-manufactured goods. This embargo was initiated last Dec. 31, two weeks after the declaration of martial law in Poland.

Arrested by the FBI and charged with conspiracy to commit interstate theft were Matthew M. David, 56, a former plumbing and heating serviceman from Aliquippa, Pa.; Floyd Edmonds, 52, a transport company owner from McDonald, Pa.; and Anthony David Jr., 38, of Los Angeles, identified as Matthew David's nephew and the Racal-Milgo employee.

No Pleas

The Pennsylvania men entered no plea when they appeared for arraignment before a U.S. magistrate Sept. 17. They were released after each posted a $25,000 bond and were slated to appear before U.S. Magistrate Robert C. Mitchell for preliminary examinations last Thursday.

The younger David was released on a $15,000 bond. He was suspended from Racal-Milgo pending the outcome of the case.

A complaint and affidavits filed by the FBI in federal court here detail the chronology of a clever plot gone sour after the defendants allegedly spoke with a mysterious informant and then fell prey to a classic FBI-engineered "sting." The plot, which the FBI claims is substantiated by taped conversations, reportedly began when a Russian-speaking informant, whom the government has declined to identify, met with Edmonds on June 10.

At that meeting, according to the FBI, Edmonds said Matthew David had contacted Soviet brokers in Mexico regarding a deal to buy stolen computer equipment for resale in the Soviet Union. Edmonds, the FBI claimed, said the goods would be swiped from Racal-Milgo.

The informant took his story to the FBI, which promptly brought undercover agent Alan J. Garretson on the scene, posing as a high-technology broker representing "overseas interests." An FBI spokesman said Garretson never attempted to pass himself off as a Russian intermediary.

In a series of taped meetings beginning July 26, Edmonds and Matthew David reportedly laid out a plan whereby the men would alter a delivery truck to resemble the kind used by Racal-Milgo. The truck was to be driven to the company's Huntington Beach, Calif., warehouse and loaded with the purloined modems, then driven back to Pittsburgh where the goods would be stashed. The heist was to be facilitated on the West Coast end by David's nephew, according to the FBI.

Garretson was told the three men would provide him with $3 million worth of communications equipment for $2 million, the FBI maintains.

At one point, Anthony David is said to have demanded $250,000 in upfront money from Garretson for his role in the conspiracy. Garretson meanwhile arranged to have Anthony David send samples of the modems to a phony office address in Washington, D.C.

The trio was arrested after they allegedly accepted an initial $5,000 payment for the modems. The FBI said Matthew David had four round-trip airline tickets to Las Vegas in his possession when he was arrested in Pennsylvania.

The FBI has declined to spell out what specific modems or other computer communications equipment the men were allegedly interested in stealing.

However, an FBI spokesman said he believes most of the equipment the men had planned to steal is on the government's so-called "commodities control list." Companies wishing to export to Soviet bloc countries any items appearing on this list must first apply for a federal export license, and these licenses have not been granted since the Dec. 31 embargo.

Nathanson said Anthony David's position at the Huntington warehouse as regional service manager would have given him maximum clearance and easy access to any portion of the building.

The FBI said the investigation into the case is ongoing, but declined to say whether any more arrests are expected.

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Software/Expo Sees Myriad of New Products

(Continued from Page 1)

Equipment Corp. VAX-11 superminis. Together, the products cost $22,500 for IBM installations and $15,000 for the DEC VAX-11 version. They can also be purchased separately, according to Issco, based at 4186 Sorrento Valley Blvd., San Diego, Calif. 92121.

Informatics General Corp. unveiled Release 3 of Mark V, an IMS application development system for IBM mainframes. Release 3 enables automatic updating to all 10 data bases and adds several new screen functions to help retrieve, update, delete or create other formats.

A data base browsing capability has also been added to Mark V Release 3, which will also be available Friday for $100,000.

Informatics also announced a free software evaluation kit for its Shrink data compression products, which run on IBM OS and DOS systems. The kit reportedly streamlines the evaluation process with a methodology including cost justification, installation and implementation. The kit can be obtained from Informatics, 21050 Vanowen St., Canoga Park, Calif. 91304.

SPSS, Inc. upgraded its batch system with SPSS-Extended (SPSS-X). This product reportedly offers refined file and data management capabilities, expanded displays, the ability to accept input in many forms and enhanced analytical capabilities.

SPSS-X is operational on IBM OS and DEC VAX-11 systems. It is scheduled for general release Feb. 1 for a $7,000 annual license fee the first year and $4,000 per year for renewals. SPSS is based at 444 N. Michigan Ave., Chicago, Ill. 60611.

Coverage of Software/Expo continues on Pages 12 and 13.

Test/IMS was introduced by Consumer Systems Services Group to help large IBM shops test their IMS application programs. Test/IMS replaces old methods of testing and eliminates simulation setup time, batch turnaround and wait time, according to the vendor. Available on a permanent license for $16,000, it offers full screen support without IBM's TSO, replaces standard dump with minidump, eliminates TSO for testing, tests all IMS functions and requires no modification to IMS, the vendor said.

Consumer Systems also announced an enhanced version of its Databasic testing tool for IBM IMS on-line and DL/1 batch application programs under OS and DOS. The improvements include a module to reduce CPU cycles, checkpoint/restart capability to reduce the risk of long-running jobs, a compare/flat base function to report on changes to the data base and options to allow limiting the subset data base size. It costs $23,500 under OS and $13,500 under DOS.

Consumer Systems can be reached through P.O. Box 3637, Oak Brook, Ill. 60521.

A version of the Oracle relational data base management software was announced by Frey Associates, Inc. for users of 16-bit and 32-bit Data General Corp. Eclipse processors. Originally designed by Relational Software, Inc., Oracle performs both batch and interactive tasks in centralized and distributed environments.

Formerly available only for DEC VAX-11 and PDP-11 machines, the Eclipse-compatible Oracle costs $24,000. Further details can be obtained from Frey at Chestnut Hill Road, Amherst, N.H. 03031.

IMSL, Inc. announced that its Math/Protran and Stat/Protran software is now available for the VAX-11. No formal programming knowledge is required to use these packages, according to the vendor.

The Math program reportedly solves problems in areas of random number generation, elementary arithmetic, interpolation and data smoothing, integration and differentiation. The statistical package assists in problem-solving areas such as basic statistics, frequency tables and cross-tabulations, correlation and regression analysis.

For VAX-11 users, the math package costs $3,000 the first year and $2,000/year thereafter; Stat/Protran costs $2,500 for the first year, and renewals are $1,500/year. Both sell for $4,500 together for the first year and $3,000 for renewals.

IMSL Library Enhancement

IMSL also announced Edition 9 of the IMSL Library, with an additional 40 subroutines, bringing the total to 540. These Fortran subroutines function as building blocks in developing scientific and engineering application programs.

Depending upon environment, the library costs $2,000 to $3,000 the first year and $1,500 to $2,500 for renewals. IMSL is based at Sixth Floor, NBC Building, 7500 Bellaire Blvd., Houston, Texas 77036.

Walker Interactive Products, Inc. added a maintenance enhancement to its single-screen transaction product called Fast/AP. This product reportedly speeds up invoice data entry and authorization procedures and works in conjunction with the vendor's Integrated Interactive Accounts Payable software. These products work on IBM and plug-compatible mainframes. Fast/AP is base-priced at $40,000. Walker Interactive Programs is located at 100 Mission St., San Francisco, Calif. 94105.

Tree-View was introduced at Software/Expo by Interactive Program Products, Inc. to permit users to see how consolidation hierarchy, or model structure, is being processed when a financial model is being developed. It works in conjunction with the company's Insight management information system software; both run on IBM's System/38 and together cost $17,000.

Interactive Program Products is headquartered at 800 Second Ave., New York, N.Y. 10017.

'Amaps' Out for HP 3000s

Also showcased was Comserv Corp.'s Amaps manufacturing software, which is now available for Hewlett-Packard Co. HP 3000 processors. Amaps reportedly features a data dictionary, a screen handler/transaction processor, on-line inquiry utilities and report writers. It is available for $105,000 from the vendor at 1385 Mendota Heights Road, Mendota Heights, Minn. 55120.

Mathematica Products Group, Inc. added relational capabilities to its Ramis II data base software with a new offering called Relate. This product boasts full relational capabilities for integrating data from multiple sources. Users can reportedly retrieve and combine data stored in Ramis II data bases, in Isam, Vsam and sequential files and in any other data base that Ramis II accesses.

It differs from other relational languages in that it provides direct relational access to data, according to the vendor. It operates on IBM mainframes and plug-compatibles and is scheduled for release in December. Relate costs $15,500.

Mathematica can be reached through P.O. Box 2392, Princeton, N.J. 08540.

SI Modifies Packages to Run On System/38

CHICAGO — In the wake of its acquisition by General Electric Information Services Co. (Geisco) last fall, Software International Corp. (SI) announced expanded product compatibility, a purchasing incentive and a software sweepstakes at Software/Expo here last week.

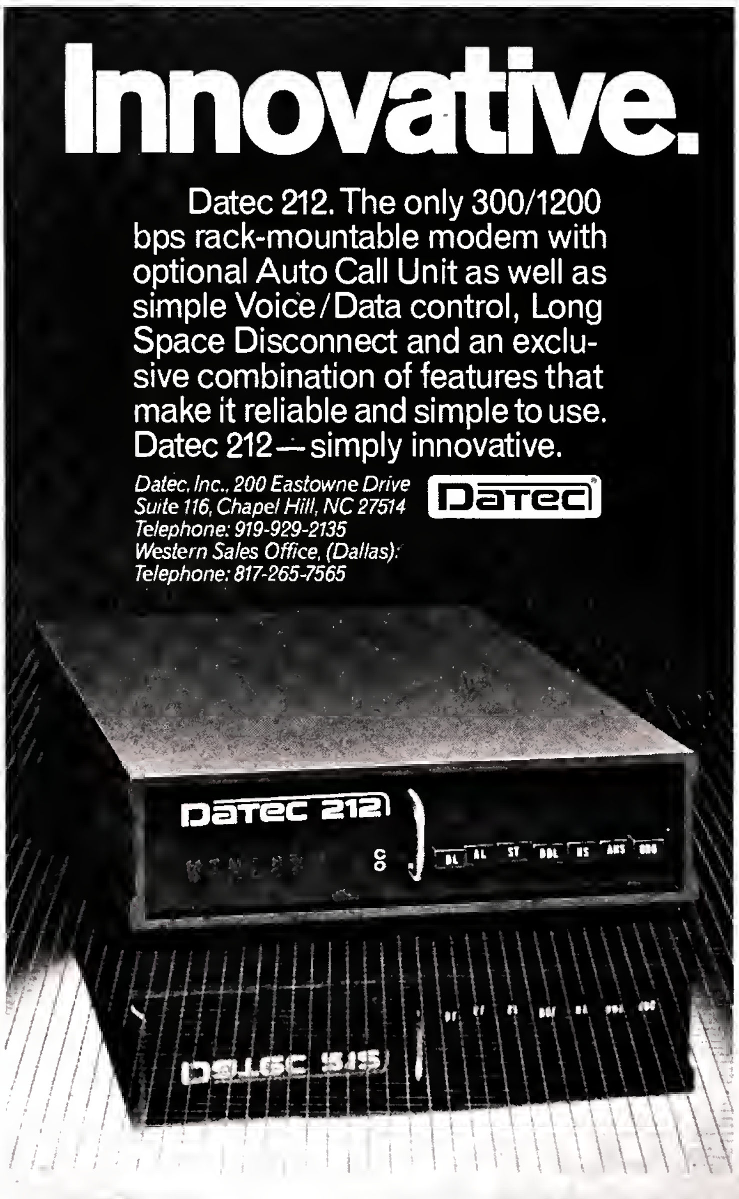
The software vendor, which was acquired by Geisco last fall, made its move into a new product arena when it announced that its general ledger and financial reporting system and payroll/personnel and accounts payable software are now available for IBM System/38 users. "There'll be more such new products in the future because many of our users are upgrading from System/34 to System/38, and we are committed to focusing our resources on our users' needs," explained Robin Reyes, SI executive vice-president.

The newly available System/38 software is priced at $32,000 for the general ledger, $19,800 for the accounts payable package and $25,300 for payroll/personnel.

Reyes also unveiled SI's Cash Preservation System, which enables users to put 25% down on an SI product and carry the balance over 12 months "with effective interest at substantially lower than current rates."

Finally, Reyes announced SI's "Be a Software Winner" sweepstakes. Every Software/Expo and SI press briefing attendee became eligible to win an SI software package, some of which are priced at $70,000 and include SI's warranty and maintenance agreements. The drawing was slated for Thursday, the last day of the show, but the winners' names were not available at press time.

This contest will be repeated at the Info '82 show next month in New York, Reyes said.



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3. **General Motors**
4. **Texaco**
5. **Standard Oil of California**
6. **Ford Motor**
7. **Standard Oil (Indiana)**
8. **International Business Machines**
9. **Gulf Oil**
10. **Atlantic Richfield**
11. **General Electric**
12. **E. I. du Pont de Nemours**
13. **Shell Oil**
14. **International Tel. & Tel.**
15. **Phillips Petroleum**
16. **Tenneco**
17. **Sun**
18. **Occidental Petroleum**
19. **U.S. Steel**
20. **United Technologies**
21. **Standard Oil (Ohio)**
23. **Getty Oil**
24. **Dow Chemical**
25. **Procter & Gamble**
26. **Chrysler**
27. **Union Oil of California**
28. **Eastman Kodak**
29. **Dart & Kraft**
30. **Union Carbide**
31. **Boeing**
32. **R. J. Reynolds Industries**
33. **Amerada Hess**
34. **Westinghouse Electric**
35. **Ashland Oil**
36. **Marathon Oil**
37. **Caterpillar Tractor**
38. **Goodyear Tire & Rubber**
39. **Cities Service**
40. **LTV**
41. **Beatrice Foods**
42. **Xerox**
43. **Philip Morris**
44. **RCA**
45. **McDonnell Douglas**
46. **International Harvester**
47. **Bethlehem Steel**
48. **Rockwell International**
49. **PepsiCo**
50. **Monsanto**

TIME! If you guessed (b)—48 users out of a possible 50—congratulations. You are a very smart data processor. And you *deserve* to be a SyncSort user.

If you chose one of the other two answers, don't be discouraged. Your mistake is understandable. The last time we reported to you, we had 46 users out of the top 50. And heaven knows you are logically correct if you decided that all 50 *should* be SyncSort users. Unfortunately, there is one company we will probably never convince. (Hint: See No. 8 above.)

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(2) POPULARITY WITH PROGRAMMERS. SyncSort drastically reduces the amount of time programmers have to devote to sorting. Using a combination of SyncSort's advanced features, it is often possible to reduce the time required for simple reports from five programmer days to one.

(3) THE BEST CUSTOMER SERVICE. Our Technical Service specialists are the best in the field. They play a key role in shaping new releases of SyncSort. And they pass their knowledge along to you—quickly and accurately—when you need it. More than 85% of all requests for sorting advice are resolved within 24 hours!

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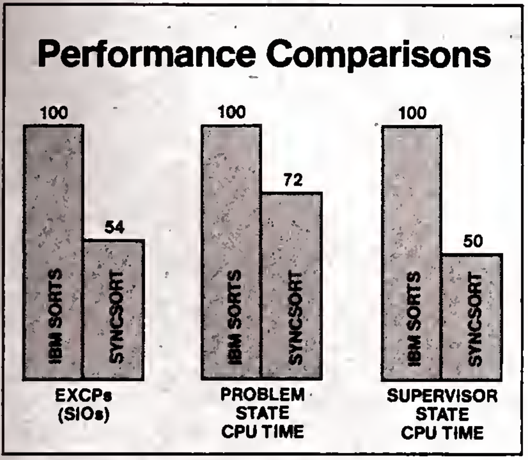

syncsort INC.

Syncsort Incorporated 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

Prime Supermini Aimed at Distributed OA

(Continued from Page 1)

tem uptime of 99% under the firm's High Availability Option (see story below).

Compatible With Series 50

The newly introduced Prime 2250 supermini incorporates the same transistor-to-transistor logic as Prime's Series 50 processors and is compatible with them, but it incorporates a number of design changes that make it more suited to office environments and small multiuser applications, the spokesman said. The changes include the addition of a microprocessor-based single-board communications controller, a less expensive diagnostic processor, a combined disk and tape controller and scaled-down power conditioning and modem facilities.

The 2250, which runs under Primos, utilizes 64K-bit chip technology and is enclosed in a desk-like cabinet that includes the processor, a 68M- or 158M-byte sealed Winchester disk drive and a cartridge tape drive that backs up the hard disk. The cabinet offers space for one more Winchester device, allowing for a total disk capacity of 316M bytes.

The 2250 presently communicates with other systems via Primenet, the vendor's networking software, and can be connnected to mainframes using Prime's remote job entry software. In a live demonstration for the press, Prime showed how the 2250 would function in an office environment — in this case, a record company with divisions in the U.S. and France. Actors played out a typical business day by sending information and electronic mail across the room, which through props and scenery was made to look like offices in New York and Paris.

First Prime-Made Terminal

Users can interact with the 2250 supermini via the PST100 terminal, an ergonomically designed device that can reportedly be used with any Prime Series 50 computer. The terminal utilizes a Zilog, Inc. Z80A processor for local intelligence and has an IBM Selectric-style keyboard, plus a 15-key numeric pad.

The terminal's 15-in. CRT display tilts and swivels and offers both line-drawing and block-graphics capabilities.

Other features of the terminal include an auxiliary printer port for producing local hard copy, international character sets, built-in diagnostics and an Ansi line protocol.

The 2250 system also includes an operator interface that reportedly allows one-step initialization, an error detection and correction mechanism, a high-speed bipolar cache memory and a hardware-controlled memory protection system, the spokesman pointed out.

While Prime's President and Chief Executive Officer Joseph M. Henson declined to comment on how much of an impact the 2250 is expected to make on the Series 50 market or how many sales are projected, he did hint that the new machine is targeted to compete in the burgeoning desktop computer market, particularly in the area of microcomputers in the office environment.

"The way to manage growth and profit is to capitalize on end-user opportunities that exist in the marketplace," said Henson, who spent 10 years at IBM before being recruited as Prime's president.

The base price of the 2250 system with 512K bytes of memory, a 68M-byte Winchester disk and the PST100 terminal is $39,900. A 1M-byte system with 158M bytes of disk storage costs $48,900. Discounts are available for quantity purchases.

For current Prime systems users, the PST100 terminal costs $1,595, with quantity discounts available.

Prime/SNA, which will be released to Prime system users in stages, will reportedly emulate most of the features of the IBM 3270 CRT terminal and IBM 3287/89 printers attached to an IBM 3274. In addition, the remote job entry capability will emulate most of the features of the IBM 3777, as well as some additional features of IBM's 8100 series computers.

Details of Prime/SNA will be available no later than next March, the spokesman said.

Prime is based at Prime Park, Natick, Mass. 01760.

Extended Service Plan Offered

NATICK, Mass. — With an eye toward system reliability and user requirements, Prime Computer, Inc. announced last week an extended customer service plan that offers options ranging from on-site service within two hours to a guaranteed 99% uptime.

Prime's Preferred Service plan guarantees on-site service within two hours. Preferred Service is available to customers located in designated metropolitan areas from 7 a.m. to 7 p.m., Monday through Friday. The charge for this plan is $400/mo.

The high availability option, available 24 hours a day, seven days a week to Preferred Service contract customers, guarantees a 99% uptime, providing certain environmental and contractual prerequisites are met. This option covers the newly introduced 2250 processor, its components and operating system and includes installation of a power conditioner and modem to enable remote interrogation and diagnostics.

The high availability option costs $500/mo, excluding the cost of the power conditioner and modem, according to the vendor.

Prime also announced the formation of a customer support center for 2250 users at its Natick headquarters. Users can call the service via a toll-free hot line and talk with system specialists regarding problems associated with the 2250 computer.

NAS Adds Trio of CPUs

(Continued from Page 1)

he added. The AS/9040 reportedly provides anywhere from two to 2.5 times greater performance than NAS' existing AS/7000 processor and is rated at 20% to 30% less powerful than the AS/9050, which in turn is outperformed 70% to 90% by the AS/9070.

NAS is also said to have developed a set of benchmark figures that compare the AS/9000 and 3080 series machines according to their instruction execution speeds, but a company spokesman declined last week to disclose the relative performance ratings.

Both the AS/9040 and AS/9050 are uniprocessors that, in a minimum configuration, incorporate eight channels and 8M bytes of main memory. The two mainframes expand in 8M-byte and eight-channel increments to support up to 24 channels and 32M bytes of internal storage.

The AS/9070, by contrast, consists of tightly coupled dual processors and requires at least 16 channels, expandable in eight-channel increments to a maximum of 32. Because of its dual-processor configuration, the AS/9070 also requires a minimum of 16M bytes of main memory, which can accommodate one 16M-byte increment, for a total storage capacity of 32M bytes.

All three of the latest AS/9000s boast a machine cycle of 38 nsec and main storage read/write memory cycle of 342 nsec, the spokesman said. In addition, the machines' buffer memory cycle is rated at 19 nsec.

Sophisticated Technology

Much of the AS/9000 series' performance is attributable to the sophistication of the processors' semiconductor technology, NAS said. For controlling I/O and certain other operations, the CPUs rely on 1,500 gate/chip very large-scale integration logic components. In their instruction processors, however, the machines use 550 gate/chip logic devices.

The AS/9000 series members also incorporate 64K-bit main memory chips and local-storage components, each of which combine 770 logic gates with a 6,144-bit recording capacity, the company said.

An 8M-byte, eight-channel AS/9040 and AS/9050 configuration costs $2 million and $2.57 million, respectively, compared to $4.15 million for a 16M-byte, 16-channel AS/9070. The base prices cover state-of-the-art features like extended addressing, MVS/SP assist and data streaming.

Deliveries of the AS/9070 and AS/9040 begin during the fourth quarter of 1982 and the first quarter of 1983, respectively. The AS/9050 is available now from NAS at 800 E. Middlefield Road, Mountain View, Calif. 94043.

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Three Turnkeys Configured Around 2250

By Paul Gillin
CW Staff

ERIE, Pa. — Shortly after Prime Computer, Inc. announced its 32-bit Model 2250 processor last week, Computer Data Processing, Inc. (CDPI) introduced three prepackaged systems based on the 2250 and said they offer full Prime 50 series compatibility.

Each of the turnkey systems — one for computer-aided design and drafting (CAD-80), one for manufacturing resource planning (MRP) and the third for office automation — costs less than $100,000, a CDPI spokesman noted. Each system includes a 1M-byte Model 2250 supermini with a 68M-byte disk and a tape drive.

The OA system reportedly includes comprehensive multiuser word processing software, full-screen text editor, electronic mail and a telex/TWX interface. The system supports over 30 types of terminals, including terminals by Televideo, Inc., Digital Equipment Corp., Micro-Term, Inc., IBM, Datamedia Corp. and Beehive International.

The OA system hardware is said to include the Prime 2250, eight Prime System Terminal Model 100 units (also introduced last week by Prime), a Diablo Systems, Inc. 630 proportional spacing printer and a General Electric Co. 510 char./sec letter-quality printer.

The OA turnkey costs about $75,000, the CDPI spokesman said.

Compared to Prime System

"The office automation package is equal in all functions and capacity to the comparable Prime system," said Dennis Erskine, president of CDPI. "But because it is more terminal-independent and requires fewer machine resources, it is faster and can support more terminals."

The drafting/design turnkey, CAD-80, is a 2250-based unit that supports multiple workstations and features an integrated finite element analysis model for stress analysis, the spokesman said.

The CAD-80 includes a voice synthesis unit that gives basic instructions to the operator, reducing the need for the user to refer to the CRT terminal. The basic system reportedly consists of a Ramtek Corp. graphics terminal, Volker-Craig, Inc. dumb CRT terminal and Houston Instruments, Inc. digitizer tablet.

CAD-80 supports Tektronix, Inc., Ramtek Corp. and Digital Engineering, Inc. Retrographic terminals, several models of digitizers and Hewlett-Packard Co. plotters.

CDPI described its MRP turnkey as a fully integrated system with shop-floor control, MRP, bills of materials, inventory and scheduled receipts functions. Hardware includes eight PST100 terminals and a 300 line/min printer. The basic multiuser system costs under $100,000, while a system that includes models for financial applications, purchasing, and expanded manufacturing systems costs $130,000.

The systems are available immediately from CDPI at 3304 State St., Erie, Pa. 16504.

Prime Announces Updated Primos

NATICK, Mass. — Together with its 32-bit Model 2250 office computer, Prime Computer, Inc. last week announced a variety of software including an updated version of its Primos operating system and a number of packages aimed at application development and programmer productivity.

Primos Rev.19 is said to include improved access control and security features, as well as upgraded access commands. Prime has enhanced the operating system's command processor and included a set of file utility commands that together produce a powerful and tailorable command environment, a spokesman explained.

The revision also includes a variety of high-level programming tools and an unlimited address space.

The updated Primos is compatible with all Series 50 computers and is available at no charge to current systems users.

Among the new commercial products introduced last week by Prime were:

- Cobol 74, a Cobol compiler that conforms to Ansi Cobol-74 standards and features local and global optimization, as well as a source-level debugger. The compiler takes full advantage of the Prime Series 50 extended instruction set, the vendor said. The license fee for this product is $10,000.
- RPG-II, a compiler said to be compatible with IBM System/3 Model 10 RPG-II and also features local and global optimization and a source-level debugger. It cost $5,000.
- Midasplus, a high-performance index sequential access method accessible from all Prime-supported languages, provides access to both local and remote files while preserving file integrity, according to the vendor. Midasplus costs $5,500.
- RJE XBM, emulator software that enables Prime systems to emulate RJE terminals over synchronous communications lines. An initial license for RJE XBM costs $2,500.

Midasplus, Cobol 74 and RPG-II are available free as upgrades to present users of the firm's Midas, Cobol and RPG products, the spokesman added.

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DEC's Crawford Captures SMIS' First Prize for Paper

CHICAGO — Al Crawford, corporate manager of digital information systems at Digital Equipment Corp., won the first-place award in the Society for Management Information Systems' (SMIS) papers competition. The prize was awarded at SMIS' 14th annual conference here last week, attended by more than 315 management information systems (MIS) executives.

Crawford's paper was entitled "Corporate Electronic Mail Communication-Intensive Application of Information Technology." It was published in the society's September issue of *MIS Quarterly*.

The second-place award was shared by Ralph Loftin, vice-president of DP services at Blue Cross/Blue Shield in Boston, and Jane Moosbruker, an organization development consultant, for their paper entitled "Organization Development Methods in the Management of the Information Systems Function."

The first-prize winner received an award of $5,000, while the second-place winners split a $3,000 prize.

The society has issued a call for papers for its 1983 competition. To be eligible for consideration, a paper must describe an MIS, an approach to developing information systems or a technique for improving or managing the MIS activity.

The work described must be in place and implemented and must have been evaluated and judged to have had a significant impact on the organization in terms of improved profit, services, communications and so on.

CW at SMIS

Abstracts should be no longer than 1,000 words and submitted by Jan. 15 to Nancy E. Markle, Manager, MIS Development, Georgia Power Co., 260 Peachtree St., Atlanta, Ga. 30302.

CW Photo by M. Blumenthal

Frederick S. Haines (center), SMIS president, congratulates Ralph Loftin (left) and Al Crawford.

Carter Cites Budget Cutting

(Continued from Page 1)

duces its staff turnover by only 10%, it would contribute about .2% to its company's earnings, he claimed. And it's not difficult to achieve a 10% reduction in turnover, he said.

Information systems departments are methodical when it comes to buying new software and hardware, but "we have to stop dumping it on our people." The frequent attitude is to "throw it into the cage," Carter charged.

Because about half the MIS budget is spent on people, it is about time to start treating them better, Carter said, adding that MIS departments will not achieve quality or productivity objectives if they continue to handle human resources the way they do today.

In examining the reasons DP professionals give for leaving their jobs, Carter said the most frequently cited one is that DP shops did not make it clear what was expected from employees. DPers also voiced the objection that the company did not have a strategic DP plan.

DPers who leave have been at the company the longest and are generally the most competent, Carter said. There are several critical items in managing people so that they will retain a commitment to the company.

MIS executives should set goals with the individual employee, not for him, and describe jobs in terms of key success factors rather than responsibilities, Carter recommended.

Moreover, he believes that the reward system has to be linked to the contribution of the individual DP professional.

Diebold: MIS Managers Turning Into Retailers

By Marcia Blumenthal
CW Staff

CW at SMIS

CHICAGO — "You used to be wholesalers, and now you are retailers."

That was the DP environment described here last week by John Diebold, chairman of the Diebold Group, Inc., at the keynote session opening the Society for Management Information Systems 14th annual conference. Diebold was referring to the proliferation of automation among various departments and divisions within the organization, which has led to a broadening of the management information systems (MIS) director's role.

"Think about the fact that there are thousands of points within the company where people are buying and operating their own systems," Diebold said.

The standard policies set by MIS chiefs when their operations were centralized — purchasing of equipment and project life cycle management — are getting skimpy treatment today.

This phenomenon requires a whole new approach to the role of MIS within the company, Diebold maintained. By the latter part of the decade, the term "MIS" will be replaced by the sobriquet "business information systems," he predicted.

In some businesses, information management is not just a support function, but the key function of the business. Industries such as airlines and hotel management are completely dependent on information systems, he explained.

Moreover, MIS is a powerful agent of change. Technology changes the types of services a company can offer. A chain of supermarkets in Florida, for example, is running its own electronic funds transfer system, he noted.

"All of this makes it abundantly clear there will be a genuine role for MIS in corporate strategic planning." But there are "precious few" places today where that situation exists. Generally, MIS people are not even part of the strategic planning group, Diebold observed.

CW Photo by M. Blumenthal
John Diebold

Nevertheless, MIS directors today are faced with the problem of helping top management understand the information systems' potential for making businesses more responsive to the technology-based competitive environment. Yet the strategic planning going on within most MIS departments is sorely lacking, he charged.

Survey Defines MIS Exec Traits

By Marcia Blumenthal
CW Staff

CHICAGO — Defining the attributes of the ideal management information system (MIS) executive may smack of *Esquire* or *Cosmopolitan* magazine's seemingly endless search for the ideal man or woman.

But an attempt to get a toehold on the qualities an MIS director needs to have in order to function in today's information age was the focus of a research project recently conducted by prominent experts in the field.

The results indicate that the ideal executive is broadly influential and highly placed within the organization and should possess line management experience, according to Les Ball, an associate professor at Babson College and one of the researchers.

'Managers of Managers'

Reporting on the survey results at the Society for Management Information Systems' (SMIS) 14th annual conference here last week, Ball said these executives must realize they "are managers of managers and not things" and have a keen awareness of the pace of technological change within the organization.

In assessing the qualities the modern MIS manager should possess, the research panel examined current trends in technology and in the business environment to try to redefine the information executive's position within the organization. One major trend in today's business environment is a shortage of capital, which calls for the MIS director to apply asset management techniques in the data center that are commonly employed elsewhere in the organization.

The researchers also determined there is a growing emphasis on planning within the organization.

As for technology, managing telecommunications was the key issue facing information system executives as people within the organization begin to use micros as personal communications tools.

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MICROPROCESSOR	16 bit/8088 8 bit/8085	16 bit/8088	16 bit/8088 8 bit/Z80
MEMORY (RAM)			
Minimum	128K	16K	64K
Maximum	768K	256K	256K
DISK DRIVE			
Type	2—5¼" floppy double-sided/ density	2—5¼" floppy double-sided/ density	2—5¼" single-sided/ quad-density
Capacity Per Diskette	320K bytes ea. 640K bytes total	320K bytes ea. 640K bytes total	400K bytes ea. 800K bytes total
HARD DISK CAPACITY	Optional 5¼" Built-in rigid disk drive (1st qtr. 1983)	None	5 MB External Winchester (Availability not known)
EXPANSION			
Parallel I/O Ports	1	Optional	None
Serial I/O Ports	2	Optional	2
Expansion Slots (type of bus)	5 S-100	5 prop.	3 prop.
DISPLAY			
(Lines/Columns)	25 x 80	25 x 80	24 x 80/132
Graphics/Pixels	640 x 225 8 colors	320 x 200 4 colors 640 x 200 2 colors	800 x 240 4 colors
OPERATING SYSTEMS	Z-DOS (MS-DOS) CP/M 85	PCDOS (MS-DOS) CP/M 86 UCSD P	MS-DOS CP/M 86/80
SERVICE	On-site	Carry-in	On-site

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CW at Software/Expo

Software/Expo Plagued by Poor Attendance

By Lois Paul
CW Staff

CHICAGO — In Anaheim last spring it was torrential rains. In Chicago last week it was a rail strike.

For one reason or another, the Software/Expo show, now in its third year, has faced difficult odds in attracting attendees to the predominantly mainframe software exhibits and conference sessions it offers. Cosponsored by the Association of Data Processing Service Organizations, Inc. and *Infosystems* magazine, the show has become regionalized, with a West Coast version in California in the spring and the national show in Chicago in the fall.

This year there was an advance registration of about 8,100 (including exhibitors) and by Thursday afternoon, the official registration totaled 9,960 attendees. Last year, the total attendance was about 10,300.

Disappointing Turnouts

There were about 127 vendor exhibits this year, many of which have grown in size and sophistication of individual booths. This is about the same number as last year. The Chicago show marked IBM's second appearance at Software/Expo. The vendor also ran some concurrent software seminars on topics such as the information center and business graphics.

Several of the exhibiting vendors expressed disappointment with the show's turnout, but said the quality of the attendees is still very good because they apparently are the people who make software buying decisions.

The Software/Expo West show in Anaheim last spring was poorly attended and the conference management company, Professional Exposition Management Co. (Pemco), partly blamed the bad weather conditions. John Dobbertin, Pemco president, admitted that IBM's concurrent Guide meeting in southern California drew 5,000 people. "Personally, I would question Anaheim for a location," he said.

Next year's western regional show will be held in San Francisco in January. Dobbertin said more than 260 exhibitors are already scheduled to attend.

Rail Strike Impact

The national conference in Chicago last week coincided with a nationwide rail strike that jammed expressways, elevated trains and buses in the city, again discouraging locals from attending the show. Dobbertin said the effect on the show was significant.

"The phones were ringing at our downtown office until 10 o'clock [Tuesday night] with people asking where they could park," he added.

Despite the poor turnout this year in Chicago, next year's national show will be held at the larger McCormack Place here, Dobbertin said.

Surprisingly, a number of the people who attended the mainframe-oriented show were looking for microcomputer software. Frank Eikenberry, director of analytical studies and planning at Ball State University in Muncie, Ind., was interested in seeing what types of software for the IBM Personal Computer are in the development stage. He explained that although his office uses Digital Equipment Corp. minicomputers, he has an IBM microcomputer at home that he uses to do the type of analysis for which he has no time at work.

Condor Computer Corp., one of the few microcomputer software firms exhibiting, was "swamped" with attendees, according to the firm's marketing manager, Acquanetta Pierce.

Among the attendees looking for mainframe software was Bill Spieth, a project leader for Northrop Corp. in Rolling Meadows, Ill. He represented an IBM DOS/VSE shop that is converting to MVS and was "trying to see what is around" in the way of MVS products. "We want to see what could help us with the conversion," he said.

An IBM systems analyst attended the show "because I was curious about the state of the software industry." Commenting on the booths and the general professionalism of the attendees, she said, "I am impressed. Maybe the industry is trying to show it is mature."

Informatics Exec Says Users Want More From Info Center

By Lois Paul
CW Staff

CHICAGO — Remember when all that users wanted from an information center was some software tools that allowed them to develop quick reports from a copy of the data base?

Those days may be gone, according to Merritt M. Lutz, group vice-president of Informatics Inc.'s Software Products Group.

Interviewed at the Software/Expo show held here last week, Lutz said the original definition of the information center involved letting end users play with yesterday's data. "They loved that for a long time, but now they want to look at today's data in additon to yesterday's data," Lutz pointed out.

If users begin to run production jobs using information center tools, a whole new set of problems will emerge. The DP manager will have to begin applying standards and setting up controls, Lutz noted. One result of this shift, from Informatics' perspective, has been an increased use of its Answer/DB, a data base product designed to allow the end user to interface transparently with an IBM IMS data base.

Informaticom is another product that Lutz thinks will fit into this particular niche. The real significance of the product, which was unveiled last spring at Software/Expo in Anaheim, Calif., "is that it allows [an end user] very easily to get into an IMS data base and subset it and do some arithmetics, if he wants to, and to bring that subset down and put it on a mini-Winchester," Lutz said.

Informaticom is a microprocessor-based software product intended to provide a link between microcomputers and mainframes, Lutz continued, adding, "It gives the end user the ability to do departmental stuff and get to corporate data, yet it includes full security."

Lutz also alluded to a change in the way his firm's target market — Fortune 1,000 companies — are approaching major software acquisition decisions. "Buying third-party software is really becoming more and more acceptable and you don't have to do as much missionary work as you once had to do. Now you are getting called in and asked, 'What do you have for the information center? What do you have for the application development center?' "

Although this closer evaluation process may shed a good light on the better established software firms, it also stretches out the decision-making curve. "That is the bad news," Lutz said.

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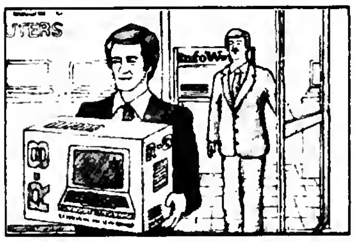

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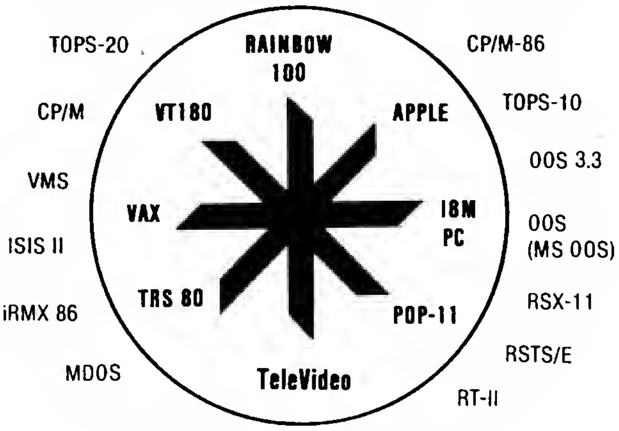

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CW at Software/Expo

No Conclusions Reached

Need for Improved Software Ratings Discussed

By Lois Paul
CW Staff

CHICAGO — Although it is not economically feasible to provide statistically valid ratings of software packages, users need information from which to begin their decision-making process.

This was the general flavor of a session titled "All You Ever Wanted to Know About Software Ratings" at Software/Expo here last week. No conclusions were reached at the session chaired by Julia Johnston, director of research and statistics for the Association of Data Processing Service Organizations, Inc. While the session had been planned as a debate involving software ratings companies and industry representatives, it was basically a review of some of the problems with software ratings and how they can be avoided.

Robert Bezilla, vice-president of The Gallup Organization, Inc., stressed the importance of great care when conducting survey research. "We learned the hard way," he said, referring to the 1948 presidential election when Gallup predicted Dewey the winner over Truman.

Bezilla offered some rules for "correct survey research." These include carefully defining the sample to determine, for example, whether the DP manager or the end user is to be the respondent.

"One very important problem is that with standard survey procedures, there seldom is a survey if there are less than 100 users," Bezilla said, noting that some software ratings have been based on fewer than 50 users.

"It is almost theoretically impossible to do a proper study," he continued. However, it is possible to do qualitative case studies that can be used to aid potential purchasers of packages. Bezilla cited personal computer software evaluations that use this type of approach effectively.

There is a need for software ratings, he continued, partly because the software industry has not provided objective standards on which customers can evaluate and compare products. "If you as an industry don't do it, the Japanese will be very happy to do it," he said.

Frank Wagner, vice-president of Informatics, Inc., agreed with Bezilla's remarks and added that the sample in software ratings is biased because it is composed of volunteers. "A large fraction of the sample may have an ax to grind," he pointed out.

Wagner cited the value of case studies presented by users of various products at meetings such as Share, the IBM large-systems users group. He recommended the method of "interviewing your peers" who have similar configurations when reviewing software packages. "Nothing can replace that particular kind of observation."

In response to questions from the floor, Elizabeth McKeown of Data Decisions, Inc. defended her firm's software ratings process, outlining some changes that have been made to address some of the issues raised. However, the viewpoints of the other software ratings firms were not represented at this session.

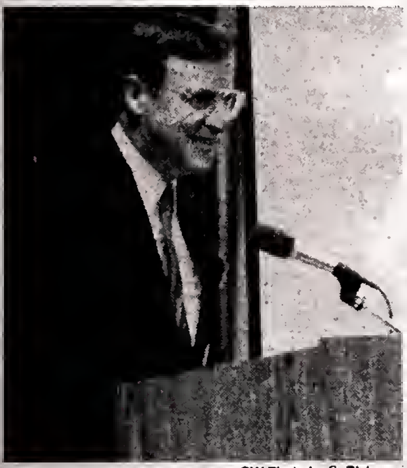
Cullinane: Software Not Hardware's 'Poor Relation'

By Lois Paul
CW Staff

CHICAGO — Software is no longer hardware's "poor relation." Instead, it will be key to the integration of the various DP components that will fulfill top managers' future information needs.

This was the major message conveyed by John J. Cullinane, president of Cullinane Database Systems, Inc., in his keynote address at the Software/Expo conference here last week.

"To this day, there is a hardware myopia," Cullinane said. "Companies think software is going to go away. It isn't going away." Referring to talk of putting a data base management system (DBMS) on a chip, Cullinane said, "All that does for you is get increased speed, improved performance." Increased speed already has become a reality, but has not provided the answer to such problems as ease of use for end users, he explained.



CW Photo by S. Blakeney

John Cullinane

"The fact is that software has finally arrived after all of these years of plugging away," Cullinane said. "Software now costs more than hardware, I am pleased to say." Looking to the future, Cullinane made some projections about the needs of organizations and the role that software will play in fulfilling those needs.

Key for the '80s

The "key for the '80s," as he defined it, is the integration of DBMS, applications software and tools such as decision support systems. He referred to the firm's recent announcement of a three-layer approach to integrating applications and decision support modules on the foundation of Cullinane's own IDMS DBMS [CW, Sept. 13].

This integration is "just now taking place and you will see a lot more of that in the future," he noted. Other future opportunities, according to Cullinane, lie in areas such as personal computers, private data bases, executive workstations, office automation, computer-aided design and manufacturing and robotics. "People are starting to take a more complete view of what is required," he said, and this points to integration.

Among the critical integration points he defined are standardization of the IBM 370 instruction set, intermachine communications and DBMS. In addition, he pointed to the need for IBM 3270 emulation to allow personal computers to network into mainframes as well as to download production data from the mainframes to the micro level.

"You can't have 400,000 users [working on personal computers] doing their own thing. They need to be integrated and that is going to take software," he said.

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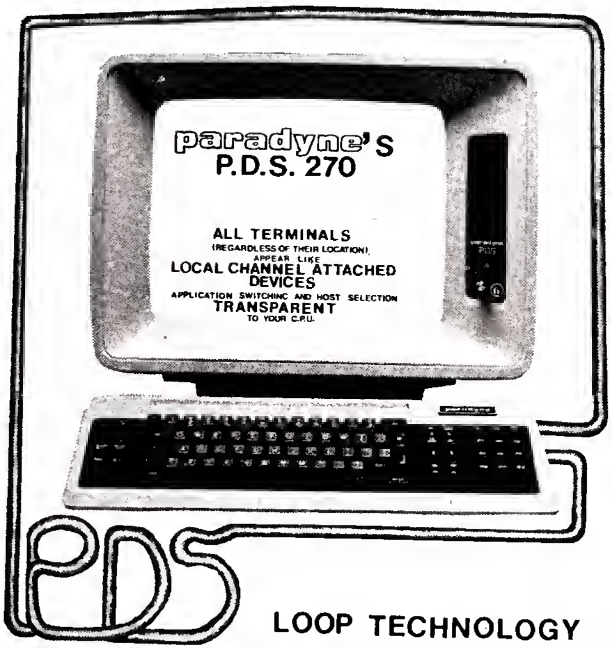

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Can DP, Communications Managers Coexist?

By Bruce Hoard
CW Staff

SAN DIEGO — Data communications managers are being swept into a sophisticated environment that demands far more knowledge than they ever needed in the past, according to attendees interviewed at the Telecommunications Association (TCA) convention here last week.

Although there was nearly a consensus on that point, the attendees were less united on the question of a possible power conflict between DP and data communications managers.

"There's more and more sophistication being developed at all levels, both on the technological and managerial side," Robert B. Gelman replied in response to a question on how telecommunications management is changing. The show manager for Cahners Exposition in Los Angeles, Gelman foresees union rather than conflict between DP and data communications managers. "I can see the melding of the two where it's going to require more skills out of each," he stated.

For Dan Reinhardt, Panafax Corp. director of personnel, data communications is "certainly an area that shows tremendous growth potential." He was "amazed" at how far communications technology has evolved over the past 10 years.

Reinhardt predicted a synthesis of the DP manager and data communications manager roles, saying, "I'd like to think that nobody's going to lose between them."

Bruce Maher, vice-chairman of the board with National Telecom Midwest in Milwaukee, said telecommunications management is changing "at a rapid pace." In order to survive, a company must avoid bureaucratic snags and act as a "private entrepreneur," he declared.

CW at TCA

Data communications and DP managers can coexist as long as they occupy the spaces allotted to them, he said.

"Telecommunications hardware is only one facet of implementing a telecommunications system," said Harold Smith, president of Concon, a consulting firm based in Long Beach, Calif. Smith said telecommunications managers must understand hardware, software and the communications needs of multiple industries.

John B. Cox, computer production control coordinator with Mobil Oil Corp. in Dallas, cited the growing integration of DP and data communications. "I think telecommunications management is becoming integrated into computer management," he commented. On the possibility of conflict between DP and telecommunications managers, he replied, "They're going to have to get together, [because] there is a conflict now."

Mike Hunter, sales manager with BFI Communications in Utica, N.Y., said he was hopeful telecommunications management would become more efficient with the improved technology available. He did not predict a data communications/DP manager conflict. "I think you're going to have a definite division of responsibilities," he said.

"I think it will require people to be more and more educated in the field," said Larry D. Basso, director of marketing communications systems with Digicon Geophysical Corp. in Houston. He said many data communications managers had come up through the ranks with AT&T and would find it difficult to adjust to the more challenging technological environment they are confronted with today.

Is there a conflict between the two types of managers? "Constantly," he claimed. "They don't talk to each other."

ACCT Rejects Generation II Via Independent

WASHINGTON, D.C. — The Ad Hoc Committee for Competitive Telecommunications (ACCT) has objected to draft legislation allowing the U.S. Postal Service (USPS) to offer Generation II electronic message services through a new "independent unit."

The association, which represents several commercial suppliers of competing services, "believes that there is no need for departing from our nation's 100-year commitment to private carriage of electronic communications and that it would be unwise to do so.

"Further, there are strong grounds for questioning whether the 'independent-unit' concept would be adequate to assure fair competition should further Postal Service pentration into the electronic market ever be allowed," ACCT said in a letter to Rep. William L. Clay (D-Mo.) and Rep. Mickey Leland (D-Texas), who chair the House of Representatives postal affairs subcommittees that have been considering legislation covering USPS electronic mail activities. A spokesman for the subcommittees said they are unlikely to take any action on the matter until Congress reconvenes in January.

Exec Tells Communications Managers How to Earn up to $200,000 Annually

By Bruce Hoard
CW Staff

SAN DIEGO — Within two years, Fortune 1000 telecommunications managers who play their cards right can earn up to $200,000 annually and be among the top three or four people in their companies, Harry Newton said here last week.

The president of Telecom Library, Inc. offered a laundry list of suggestions to attendees at the Telecommunications Association (TCA) conference. Newton started by noting, "It's easy to dump on Bell, isn't it?" but dramatized why in many cases it is end-user organizations, not the telephone company, that are responsible for communications network problems.

CW at TCA

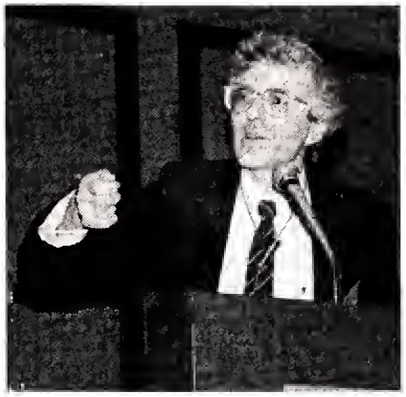
As an example, he cited an unnamed company with a yearly telecommunications budget of $30 million and one full-time communications manager. According to Bell, it spent an exorbitant amount of time putting out "brush fires" for that company as it lurched from one minor but nettlesome problem to the next, he said.

Then Newton put his audience on the spot: "How would you like to be a Bell account rep on your account?"

Starting his laundry list, the flamboyant Newton urged telecommunications managers to put together a comprehensive, five-year senior management plan for their firms' communications needs. By so doing, they will gain visibility and credibility while letting vendors know what they can expect.

Secondly, telecommunications managers should confer with top management at least once every six months, he said. The benefits of that are again credibility and visibility.

"Bring your accomplishments to their attention," he declared.


CW Photo by B. Hoard

Harry Newton

Telecommunications managers should focus their attention on the key corporate discipline — the way their companies deliver products and services to the end user, he asserted. They should not focus their attention on saving money anymore than they should insist that an "$8,000 console" be placed on every desk, he added.

In order to be current on what is happening, Newton claimed his audience should subscribe to 40 publications, not all of which need be devoted to telecommunications. The suggestion was met by exclamations of disbelief from attendees.

Managers Compared

At the same TCA panel, James J. Sobczak, vice-president of telecommunications services at the Bank of America, compared the telecommunications manager of today to the DP manager of 1967.

After predicting that such developmental technologies as video conferencing and fiber-optic communications will soon become commonplace, he said telecommunications will have the same impact on society as DP did during its high-growth years.

Telecommunications managers have the advantage of being able to learn from mistakes made by DP managers, he pointed out. For instance, DP managers did not think "big enough." Sobczak claimed that in 1967 most DP managers would have scoffed at the opportunity to have a computer 30 times more powerful than what they were currently using.

They did not see any use for so much more processing power, he explained. Yet 15 years later, such computers are in use, he observed.

The Biggest Mistake

The biggest mistake made by DP managers was losing their business perspective, the vice-president commented. They became enamored of high (and sometimes unneeded) technology to the detriment of their firm's overall business needs.

Some DP managers also put the interests of their computer systems above that of their fellow human beings, he said. As a result, many an otherwise sound hardware and software combination fell by the wayside because the human element was unwilling.

Finally, he urged end users to throw down their apathy and become active in what he called the "regulatory arena." Telecommunications is a regulated industry and telecommunications lawyers in Washington, D.C., are as important as telecommunications engineers in Silicon Valley, he concluded.

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CW Surveys Computer Managers

People, Money at Root of DP Execs' Problems

By Bob Johnson
CW New York Bureau

NEW YORK — People and money represent a DP manager's biggest day-to-day problems.

That was the consensus in a recent *Computerworld* telephone survey of computer executives. The survey attempted to discover what these managers perceive as the major stumbling blocks to a smooth operation in their shops.

Focusing on the New York metropolitan area, which contains the nation's largest concentration of DP users, the survey found that a majority of computer managers have a hard time finding and keeping qualified, reliable people.

Another major problem is getting enough money to purchase what they need in terms of hardware, software and services.

Need for Good Personnel

Tom Sharp, DP manager at the Multiwire Division of the Collmorgen Corp. manufacturing company, said the bottom line in running a good shop is getting output to the user on time. "That usually hinges on whether you have good personnel," Sharp said.

"One of my biggest problems is hanging on to good people in both the operations and programming areas. It seems as though a lot of people in the computer industry like to jump from one job to another, unless they are very happy," the DP manager observed.

"You also have people who start as trainees and then naturally want to move up. Typically, operators want to become programmers and so on. You can't stop them from moving," he continued.

Sharp noted that although keeping personnel is sometimes a problem, he has been fortunate with a staff that gets output to users on time. He attributed success in retaining a good staff to "careful" communication with them.

"You have to know how to deal with people and you have to offer competitive salaries," Sharp explained.

Another DPer who pointed to personnel problems as a major annoyance was Kevin O'Neill, operations manager at the Bank of New York. He characterized end users as the consumers of information that is the product of the DP department.

"Users don't care how long it takes or how complex an operation is to get their output, they just want it," the operations manager said. "If your personnel are not aware of this, and for whatever reason are not doing their jobs, everything goes astray," he said.

O'Neill maintained that there are few "superstars" in operations and that a team effort is required for overall success.

"My hardware is usually reliable. Software can be fixed pretty quickly, so my main concern is the people behind it all," he said.

Budgetary Needs

Lack of a sufficient budget to meet DP needs also ranked high on the list of respondent's trouble spots.

Jerry Merrilli, director of DP for the Metropolitan Museum of Art, said that satisfying user requests is his biggest concern, but explained that all DP problems can be solved if there is enough money to get what is needed.

"After they [users] have learned what a computer can do, they want everything, and it can pose a problem. But satisfying all of their wants can be accomplished by having the right resources. My user problems imply budgetary limitations and I think that principle is true of all shops," Merrilli said.

The DP executive noted that when he is faced with money limitations, he utilizes an in-house DP liaison to interact with users in an effort to get around problems. The liaison offers users alternative methods to get what they want while lessening the computer area's load.

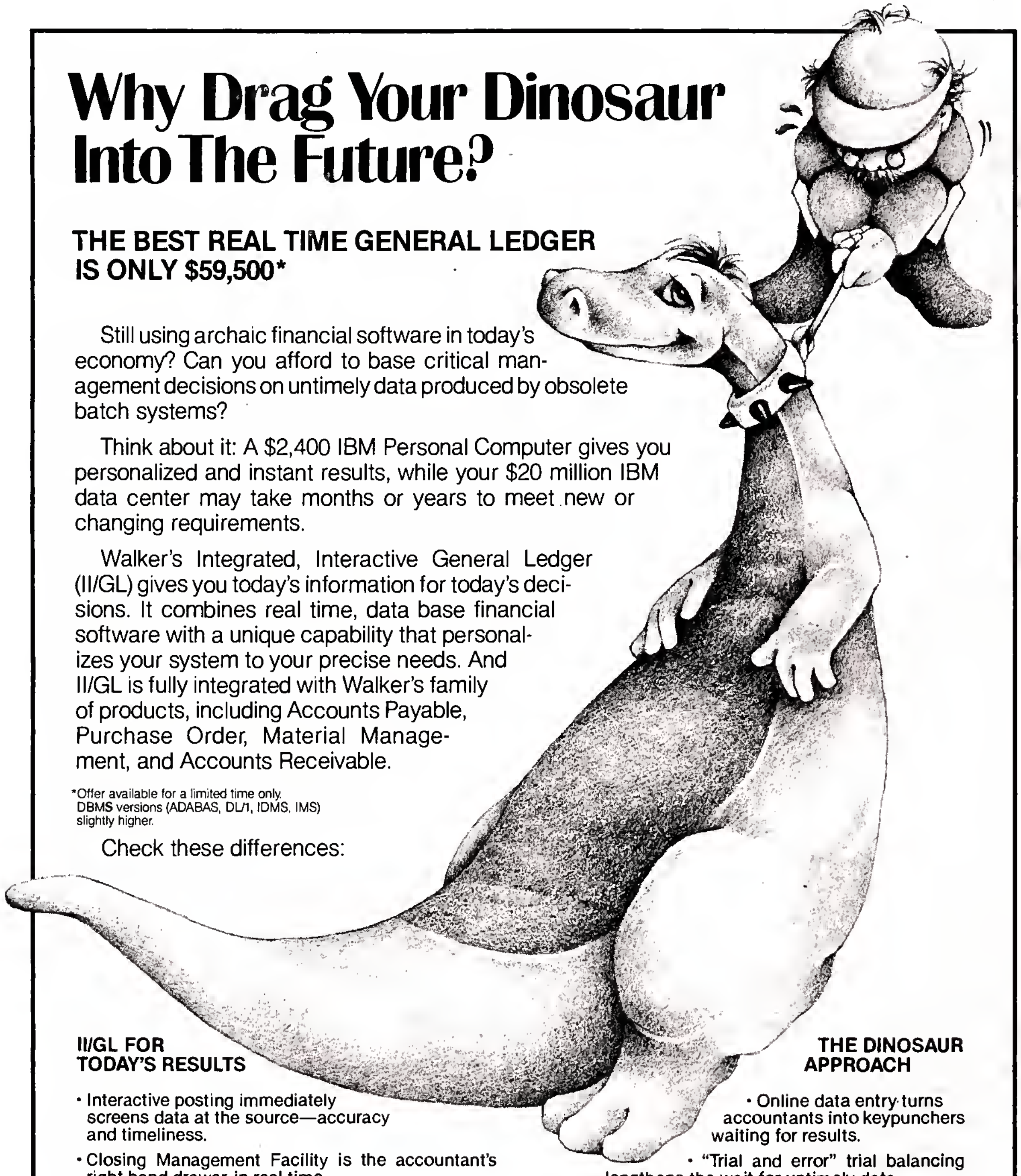
Budgetary concerns of a somewhat different nature were expressed by Robert Hatala, director of DP for the Research Cottrell Co. Hatala said that his primary problem is the DP planning process in terms of the current economy.

"It is difficult enough to forecast regular business functions in this economy, and when DP support is addressed it becomes even more complex," he said.

In the past, it was fairly easy to budget the DP operation because things such as long-term leasing were fairly predictable, according to Hatala.

"In the old days we could expect IBM to announce a new product every five or six years, and we budgeted in accordance," he observed. "We were able to keep a track record of major equipment.

"Now, however, with new products springing up overnight, it becomes a problem to do the budget. We have to ask ourselves if it's wise to upgrade our hardware or wait to see what's going to be out next," Hatala said.



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Hard Times Keeping Black DP Firm on Its Feet

By Bruce Hoard
CW Staff

DETROIT — Hard times helped black DPer Joseph Urquhart start his young company, and hard times are keeping the vital, if somewhat lean, firm on its feet.

During an interview at the fourth annual convention of the Black Data Processing Associates here last week, the 36-year-old president of JNJ Systems Consultants, Inc. talked about the awkward process of starting a minority-owned DP company.

What it came down to for Urquhart was, if you don't have it, you can't spend it. And not so long ago in November 1980, he and a partner did not have money, advice or any of the other resources needed to build their own company.

As a result, they put together a low overhead operation that Urquhart said undercuts the well-endowed turnkey systems and consulting companies with which JNJ competes.

CW At BDPA

Overcoming Lean Days

What Urquhart did have in those lean days was 14 years of systems experience and enough of working for somebody else. "I was just getting to the point where it wasn't fulfilling any more," he remembered. "So one day we said, 'Let's start a business.' "

The struggling entrepreneurs read all they could about starting a business, but it did not seem to help. They did not know the tax laws or anyone who did. They made a lot of mistakes. "We were laboring under trial and error," the Brooklyn, N.Y.-born Urquhart observed.

Their first break came in May 1981, when Lockheed Missiles & Space Co. hired JNJ for consulting services on its large IBM systems. Asked how much the contract was worth before expenses, he stretched his memory to recall the total of those hourly wages. He came up with "about $100,000," or enough to bankroll a first turnkey system for the now-incorporated company.

Urquhart was convinced that once he got his foot in the door with a hardware package, his software expertise would keep it wide open for repeat business. "We felt we needed a demonstration system to sell our software," he explained.

The Next Step

The next step was picking up a small business computer system. Vector Graphic, Inc. wanted the still-undercapitalized firm to sell 24 of its systems in a year. Too much, Urquhart said. Then he discovered NNC — No Name Computers that is. No Name gave him a 45% dealer discount on a single 64K-byte CPU, S100 bus system with two 8-in. floppy disks. Urquhart added a CRT terminal and printer, and JNJ's first commercial hardware offering was born.

The company has sold two such systems and Urquhart believes its future lies in selling more. But hard times have knocked again and at least for the near future, the firm will stay with the purchased and modified software that provided most of its $85,000 gross last year.

That may not sound like a lot of money, but with only one full-time office worker and a grand total of $200 of debt, it's more than enough to give JNJ a good profit margin. Urquart has access to 60 contract programmers (most of whom are black) for his consulting needs, but prefers to keep his corporate employee roles low ("It makes it easy for taxes").

Urquhart preferred to discuss the positive rather than negative aspects of being a black DPer. The federal government requires a certain amount of minority participation in its contracts, he pointed out.

Racism Not A Scapegoat

On the negative side, "The drawbacks are sort of inherent," he said, referring to the general lack of resources available to minorities. But he refused to use racism as a scapegoat, despite the fact he has never sold his services to a white-owned company other than Lockheed. "It just never happens," he said.

That will change if his plans work out. He and Vice-President Jerry Clayter have joined forces with the accounting firm of Peat, Marwick and Mitchell & Co. in pursuit of a $4 million consulting contract with the Southern California Rapid Transit District. Urquhart decided it was better to join Peat, Marwick after it and other accounting firms repeatedly beat JNJ out of contracts.

Urquhart sees his company's strength in its independence from a single vendor and its staying power. "We're not going away," the president declared.

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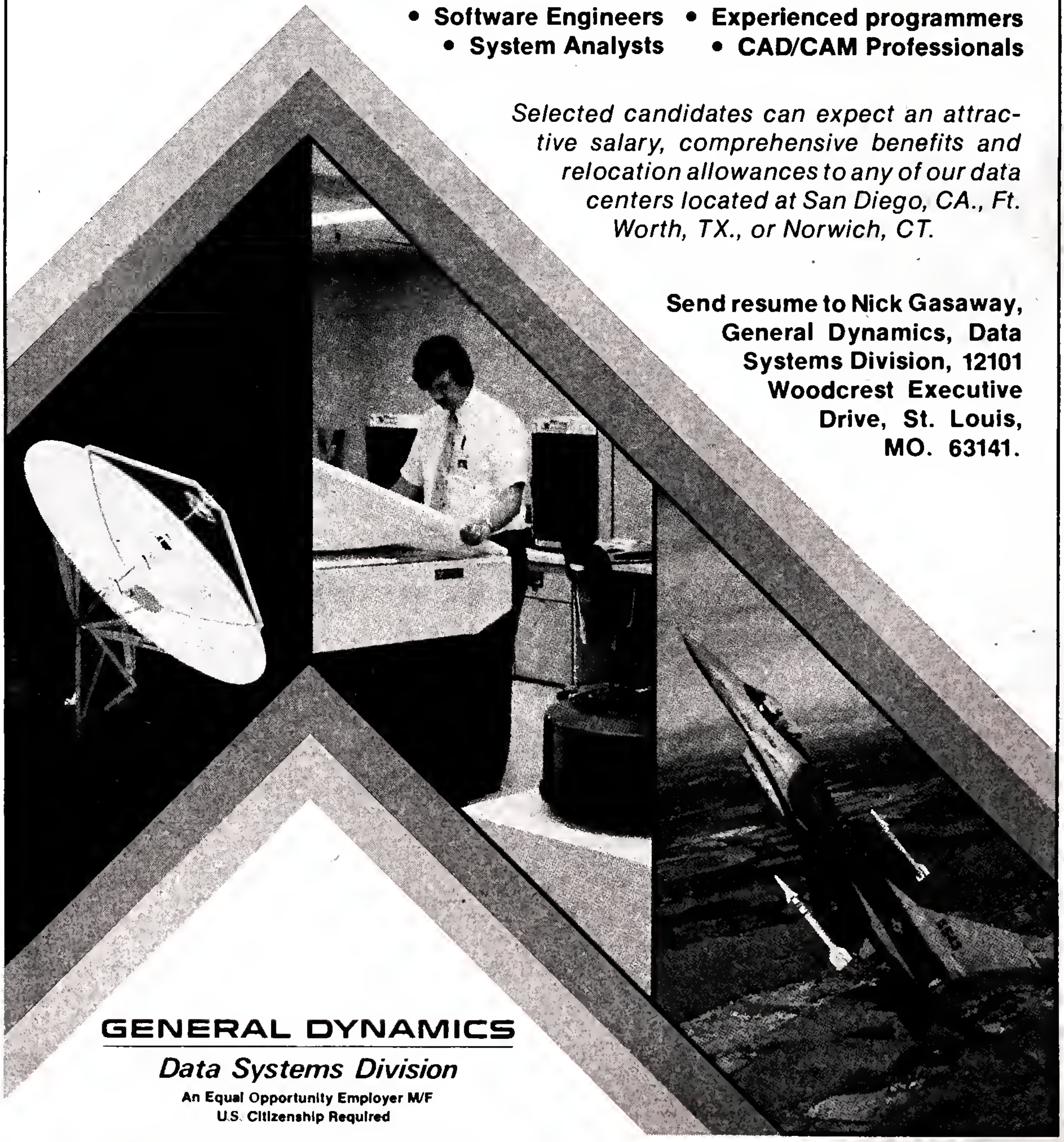

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'Psychological Contract' Urged

Take Care of Business First, Black DPers Told

By Bruce Hoard
CW Staff

DETROIT — The approximately 100 members of the Black Data Processing Associates who met here last week at their fourth annual convention were told to take care of business before spending their money on pleasure and were urged to use a "psychological contract" when negotiating for a management position.

Ray Robinson, corporate relations director for the American Management Association, spoke at a workshop titled "Financing and Starting a New Business."

The former Chemical Bank employee discussed real-life experiences that he had gone through in which blacks had borrowed money from Chemical Bank and then squandered it to the detriment or destruction of their young businesses.

"Here is one of the chronic situations that I've seen us as a race of people get involved in," Robinson said. "If your accountant or banker tells you something won't work, listen to him," he advised. "That is part of their expertise."

Robinson related a story about a fellow black who had asked him for a loan to cover his expenses in knocking out the foundation of a building. The man wanted $25,000 and expected to clear $95,000 from the job. Robinson lent the contractor the money only to find the contractor spent it on a Lincoln Mark IV and other luxury items. "He went out of business a year later," Robinson concluded.

Dealing With Bankers

Bankers are more inclined to do business with people who borrow as little as possible against their probable future earnings, he said.

And when the banks crack down on bad debts, they tend to start with small minority firms that have mismanaged their affairs "because we're stuck with this kind of institutional racism."

In the event someone does not have the money to repay a loan when it becomes due, the corporate relations director said the borrower should be sure to have clear, concise reasons. Presented with those reasons, the bank may extend the loan for another 60 or 90 days.

Robinson recommended not bothering to try to get a loan from the Small Business Association (SBA) because of the impact of Reaganomics. "There is no money in the SBA for us anymore," he said.

Mildred Saunders, a training and development specialist with the American Management Association, talked about "Self Development Strategies for the Black Manager." Her comments revolved around managing what she termed the "psychological contract." "Few areas of executive life have been so exclusionary for blacks as management," she said.

In 1970, 24,000 black men and 9,000 black women had reached management out of a total group of 1.5 million managers in the country, she said, adding that by 1985 there is expected to be a 500% increase in black male managers and a 350% increase in black female managers.

One way for blacks to overcome doubts about what they want and what is expected of them is by using the psychological contract, which assumes that both the employee and the employer have certain needs, she said.

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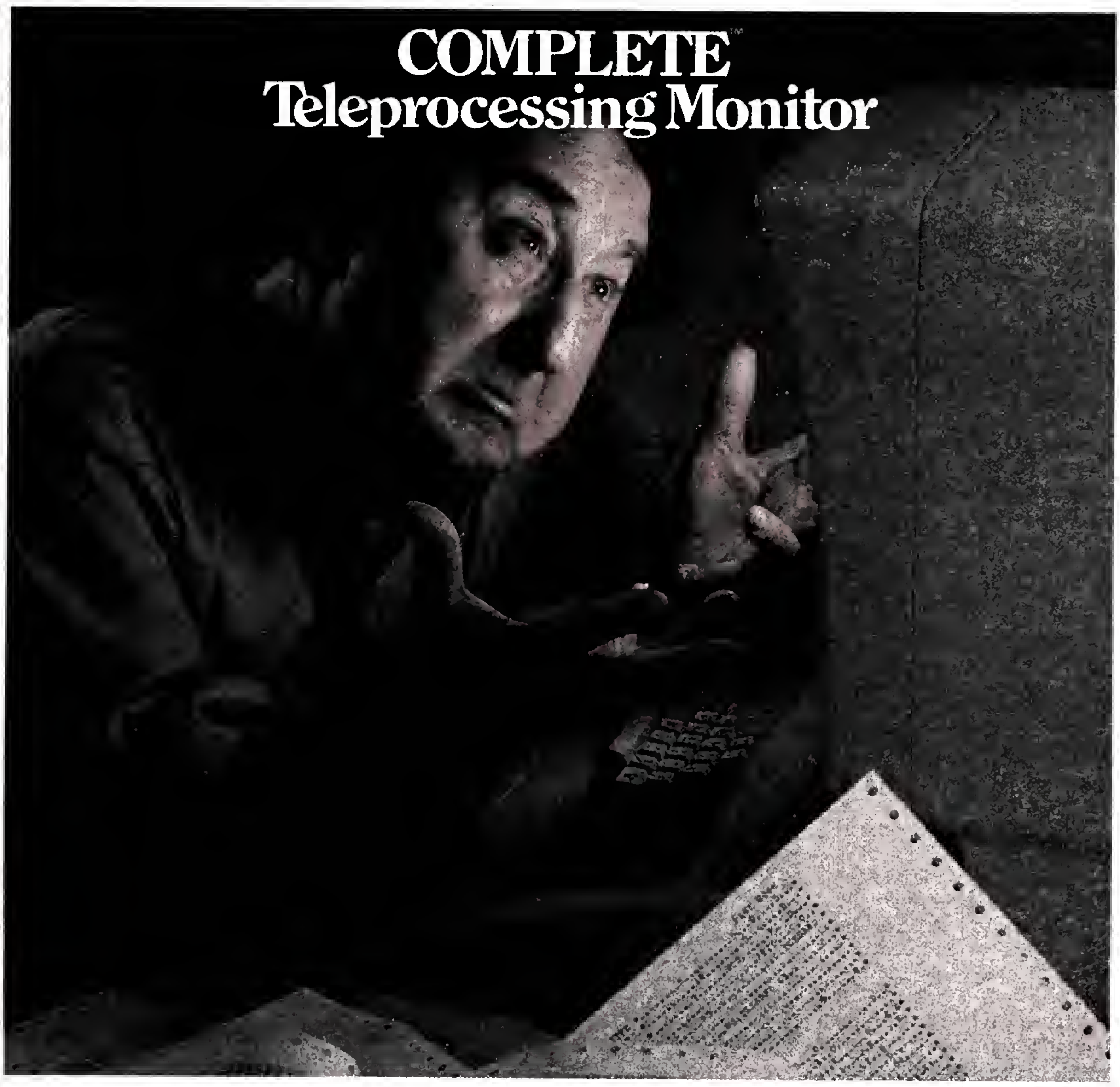
At BDPA

The employee expects reasonable working conditions and decent pay, while the employer expects a reasonable amount of productivity from the employee.

As Saunders explained it, these unspoken expectations have a tendency to establish a certain amount of equilibrium between the two parties, providing a good starting point for negotiations. She said 65% of expectations on both sides are not verbalized.

If basic expectations go unmet and the psychological contract is broken, the contract can be renegotiated, continued in an alienated state or severed entirely.

If the relationship is maintained on an alienated basis, the end result for management can be low productivity, or "all the little sabotage jobs that our employees do to us," the training and development specialist warned.



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The very word "teleprocessing" has the ring of urgency, a tool to provide quick response in a dynamic data processing environment. So why do most TP monitors available for IBM 4300 and 370 systems take up to 2 years to develop an application and several weeks to make even minor changes? One reason is that some systems don't support online interactive development. Some have such a complex operating system interface that only the most experienced system programmers can communicate with the system. And some force you to waste time and computer resources using separate development and production systems because they don't offer a comprehensive storage protection scheme.

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Two Others Reported Ready

Bell Firms Request Dems Licenses

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — Pacific Telephone Co. and the Chesapeake and Potomac Telephone Co. (C&P) have requested licenses from the Federal Communications Commission (FCC) to operate digital electronic message services (Dems). At least two other AT&T operating companies — New England Telephone Co. and Illinois Bell Telephone Co. — reportedly are about to file similar applications.

The Pacific Telephone application proposes a two-node digital termination system (DTS) in Los Angeles, while C&P wants to operate single-node systems in Baltimore, Washington, D.C. and Richmond and Norfolk, Va. A Dems network consists essentially of terrestrial or satellite intercity channels connected to a microwave-based DTS in each of the cities served.

Both applicants emphasized that authorizing them to offer Dems would provide the following multiple benefits to their data communications customers:

- DTS facilities would provide interim service to customers waiting for Dataphone Digital Service (DDS) or similar wideband channels and would serve customers located beyond the reach of existing wideband networks.
- Charges now levied on wideband customers who have short-term requirements could be greatly reduced. These customers must now pay hefty "special construction" charges because terminations to wire- or cable-based wideband channels are expensive to install and seldom can be reused. The DTS subscriber terminal, by comparison, "can be moved easily and reused over and over," Pacific Tel said.
- Additional competition provided by allowing telephone companies into the Dems marketplace could make the benefits of digital wideband transmission available to additional users, assuming DTS proves more economical than existing wideband local distribution systems, according to Pacific Tel.

Both carriers are proposing systems similar to the ones announced by earlier Dems applicants. In each city served, one or more transceiver nodes will communicate with users in the surrounding areas via full duplex microwave channels. The user station consists essentially of a dish antenna two feet in diameter mounted on a rooftop or in a window opening, connected by coaxial or fiber-optic cable to a terminal interface.

C&P plans to use a transceiver developed by Nippon Electric Co., which operates through four adjacent antennas, each serving a 90° sector. The channel beamed to each sector can carry up to 1.285M bit/sec and has a range of seven to 10 miles, the company reported.

Pacifc Tel said it would use a transceiver system developed by Local Digital Distribution Co. of Germantown, Md., which consists of three adjacent antennas, each serving a 120° sector. The Pacific Tel channels will transmit at 800K bit/sec in either direction.

So far, 36 carriers have applied for Dems licenses.

Calcomp Users to Meet Nov. 1

ANAHEIM, Calif. — The Systems Division of California Computer Products, Inc. (Calcomp) will host its biennial Cal-Group International Users' Meeting at the Disneyland Hotel here Nov. 1-3.

The conference will include product status presentations by Calcomp personnel and special-interest forums covering applications in architectural, mechanical/structural and civil engineering. Demonstrations of the newly introduced 16/65 system processing facility and color workstation will be held at Systems Division headquarters following the close of business on Nov. 3.

The registration fee is $75. Calcomp's Systems Division is based at 3320 E. LaPalma Ave., Anaheim, Calif. 92606.

Distributed data processing with a network of IBM small systems

ACE HARDWARE SPEEDS UP SOFTWARE DEVELOPMENT, NAILS DOWN INFORMATION.

It takes the right tools to build a distributed data processing system that provides up-to-date information out in the field, while maintaining central-site control. Ace Hardware Corp. found the answer in a network of IBM small systems.

An IBM 8100 Information System in each of Ace's regional distribution centers has compressed the time it takes to process orders, while expanding both warehouse and programmer productivity. The 8100s are tied through phone lines to a host IBM 3033N in Ace headquarters in Oakbrook, Illinois. Ace—the second largest chain of retail hardware stores in the U.S.—is a coopera-

Ansi Readying Business Transmission Standard

By Lois Paul
CW Staff

YOUNGSTOWN, Ohio — A proposed standard for transmission of purchase orders and invoices over telephone wires between companies may be available by November.

That is the word from Thomas C. Jones, chairman of the American National Standards Institute's (Ansi) X12.4 subcommittee on open systems architecture, which is part of the Ansi X12 Committee on Business Data Interchange. According to Jones, the committee's goal is to provide standards whereby companies have one software program that translates these business forms into a common external format and another software program that translates them back when they reach the receiving company's system.

Currently, when a company has a document stored in its system and wants to send it to another company's computer, the document must be printed out on paper and sent to the second company. The second company then has to keypunch it and enter it into its system, Jones explained, noting that this process invariably includes some errors and omissions. "We are cutting out the errors and omissions, and we are also cutting out the keypunch operation," he added.

The work of the X12 Committee involves the creation of a standard data dictionary that includes definitions of the various fields. The X12.4 subcommittee is trying to come up with a single common way of creating the definitions for a business document, Jones continued.

The X12 Committee sent the standard out for public review and made some changes based on the response. When the standard goes out again — within the next several weeks — there will be another two-month review. At a committee meeting scheduled for November in Tampa, Fla., Jones expects to have a standard for at least purchase orders and invoices.

Potential Savings

Jones cited a study that indicated if half the people in the grocery industry decide to use this standard for half the documents they transmit, they could save $3 million a year.

If this is extrapolated to include other industries, he said, American businesses using the standard 50% of the time could save $10 billion a year. The savings would come directly from cutting keypunch costs and indirectly by the elimination of errors.

The standard will increase DP work load initially, Jones noted, because translation software will have to be installed. However, as new applications emerge, the same software can be used.

What the committee and subcommittee are providing are standards for the translation of documents for transmission between businesses. It will be up to commercial providers to develop and market the software to implement the standard.

Digital Equipment Corp. has already developed software that is being used by Western Electric for DEC machines, Jones said. Other vendors are following suit, but at this point the committee's work ends because no validation procedure of the resulting software has been established, he added.

Phoenix Users Set Meet for Nov. 10

COLUMBUS, Ohio — The first national meeting of users of Goal Systems International, Inc.'s Phoenix will be held in conjunction with the Nov. 7-10 Data Training '82 conference here.

The Phoenix users group meeting will begin after Data Training '82's closing luncheon in the Mark Adams Hotel, Nov. 10. Guest speakers and group discussion are scheduled from 2:30 p.m. to 5:30 p.m.

The free meeting is open to current Phoenix users and to those who have the computer-based training package on active trial. More information is available from Goal Systems, 5455 N. High St., P.O. Box 29481, Columbus, Ohio 43229.

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Van Wert points out that Ace wanted a distributed system that would permit central development of remote application programs, rather than placing DP staff in each warehouse. Ace also wanted to assure the integrity of information at the warehouses through backup at headquarters.

Dramatic Gains

"The 8100 has not only met those requirements," Van Wert reports "it also helped programmer productivity to the point where it took half the expected time to write applications and bring the programs on line.

"We demand the same high degree of service from the companies we deal with as our dealers expect from us. With IBM, we've always received it, from the excellent people who helped us develop the applications to the service representatives across the country who can get there fast if we need help.

"Distributed data processing was waiting to happen at Ace. The 8100, made it happen."

For details on how a network of IBM small systems could help put distributed processing on your map, write IBM, 1 Culver Rd., Dayton, NJ 08810. Or call, toll-free, IBM Direct 1 800 631-5582, Ext. 90. Alaska and Hawaii, 1 800 526-2484, Ext. 90.

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Vendors Explore OA Micro Communications

By Bruce Hoard
CW Staff

BOSTON — When it comes to data communications between personal computers, users want to "make it, shape it and ship it out," according to Mark Klein at The OA Forum here recently.

Klein, executive vice-president of IE Systems, Inc., and John A. Parsons, president of Micro-Integration, Inc., gave users the whys and wherefores of data communications between personal computers at the conference sponsored by CW Communications, Inc.

Parsons noted there are two basic personal computer-to-personal computer communications vehicles: common carriers and local-area networks. Common carriers provide relatively low-speed transmission over long distances and through dial-up lines. More expensive leased lines are also available.

One disadvantage of common-carrier communications is their asynchronous protocol, which usually does not provide error detection and correction, Parsons said.

Local-area networks are characterized by high transmission speeds and such protocols as IBM's Binary Synchronous Communications and Synchronous Data Link Control, but limited to a much shorter maximum-transmission distance of approximately a mile, he observed. In addition, they require cable between each node.

Parsons said he prefers Xerox Corp.'s Ethernet local-area network because it is supported by multiple vendors and may be licensed inexpensively. Should a user decide to go with a proprietary local network such as Wang Laboratories, Inc.'s Wangnet, he would be "stuck with that vendor's equipment," Parsons observed.

When implementing a personal computer data communications network, the most crucial element is planning, Parsons said. In terms of hardware, that means microcomputers or other office automation equipment, modems and desired transmission speeds. On the software side, it is necessary to plan for communications software and needed applications. All hardware and software must be compatible, Parsons stressed.

The resultant communications should be fast, error-free and user-friendly. He emphasized the user-friendly aspect, saying even the "lowliest clerk" should be able to work the system.

Klein said one benefit of using communicating personal computers or workstations is saved desk space. More money may be saved because a desktop workstation can consolidate several functions such as typewriting, word processing and general CRT terminal functions, he explained.

Communicating workstations also reduce the workload on existing DP equipment by offloading functions normally performed by a host, Klein commented. For instance, some minicomputers may be "stopped" by large word processing loads, he observed.

Furthermore, data can be entered locally, with local verification, and then sent back to the host in batch mode at a convenient and cost-effective time, he added.

He pointed out that there are some dangers to information sharing, most notably security related problems. Where larger systems depend on passwords for system access, personal computers are more vulnerable and the preferred form of safe storage may be in a locked vault.

Personal computers may also be more susceptible to errors during transmission, Klein noted. That may not be important to some kinds of transmissions, but certainly would be in the case of payroll data.

"It is really important to use an error-correcting protocol in a business environment," he commented.

DPMA Offers Grants/Awards For Education

PARK RIDGE, Ill. — The Data Processing Management Association (DPMA) Education Foundation has established a grants and awards program to provide funding for projects that further education in information processing, computer science and computer applications in business.

A proposal evaluation committee has been established to review and recommend action on proposals. The committee is chaired by Bruce E. Spiro, certified data processor, member of the Education Foundation's Board of Regents and chief of the Automatic Data Processing Equipment Systems Management Office of the Defense Communications Agency.

The committee expects to distribute $25,000 in grants at its 1983 meeting. An Education Foundation spokesman said the committee will consider a wide range of topics, but an orientation toward information systems management education is essential.

The 1982 deadline for grant proposals is Dec. 10. More information is available from DPMA International Headquarters at 505 Busse Highway, Park Ridge, Ill. 60068.

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"How does Lanier connect to my IBM mainframe?"

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"But isn't SNA compatibility difficult and time-consuming to implement?"

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"How does Lanier implement the SNA protocols?"

"Internally, Lanier resource sharing treats every process as an LU4. The Lanier bridge functions as a PU2. Then, from the

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One Reason: Unstable Economy

Firestone Exec Explains Factors in Move to DSS

By Susan Blakeney
CW Staff

DANVERS, Mass. — An unstable economy was one very good reason for Firestone Tire and Rubber Co. to implement a decision support system (DSS).

Other factors in Firestone's move to DSS included increasing foreign and domestic competition and the increasing difficulty in tracking the company's numerous and diverse business operations, according to Joseph J. Bode, director of DSS and Management Sciences for the multinational rubber manufacturing and retail company, which boasts annual sales in excess of $4 billion.

Bode recently recounted the implementation of Express, a DSS from Management Decision Systems, Inc. of Waltham, Mass., when he spoke before the Express User Group International Conference here.

Two New Objectives

In 1979, Firestone management developed two new objectives:

- Increase operating efficiency and profitability.
- Direct the company into profitable markets and ventures.

The only problem was that the company's existing systems did not support these objectives, Bode recalled. The DP department could not begin to address the diversity of the company's information needs or management's ad hoc inquiries, and business analysis functions were not inherent within the existing systems.

The threefold solution to this dilemma took the form of DSS implementation, business system development and the establishment of a Firestone data center.

The short-term goal of "the DSS Mission," as Bode called it, was simply to support senior executives through DSS implementation. The long-range goal of this mission was to expand DSS usage through Firestone. The DSS strategy, Bode said, was to support the overall corporate strategic plan and provide management with the analytical tools and capabilities to run the company more successfully.

The issues raised at the intial phase of DSS implementation were manifold; corporate accounting and financial functions were largely decentralized. Also, Firestone executives were unfamiliar with computers — many could not even type — and they were almost impossible to pin down in terms of a training schedule. Bode said the need to provide something usable and useful immediately was critical.

Key Decisions

The implementation group quickly reached several key decisions, according to Bode. The first was to limit the scope of the user group. Next, it developed a simple, menu-driven approach to get the user on the system. Third, it decided it should start quickly, so it brought in the Dow Jones & Co., Inc. news service as a vehicle to acquaint the users with the terminals and the system. "Start quickly," Bode advised, "while interest is high."

The implementation strategy also included the development of a "straw man" data base, along with a DSS conceptual design, based on the user interviews conducted by the group. An executive steering committee was set up to assist in the initial design and also to become educated in the potential of DSS. Finally, the implementation group provided

(Continued on Page 24)

'Express' Goals Detailed at Meet

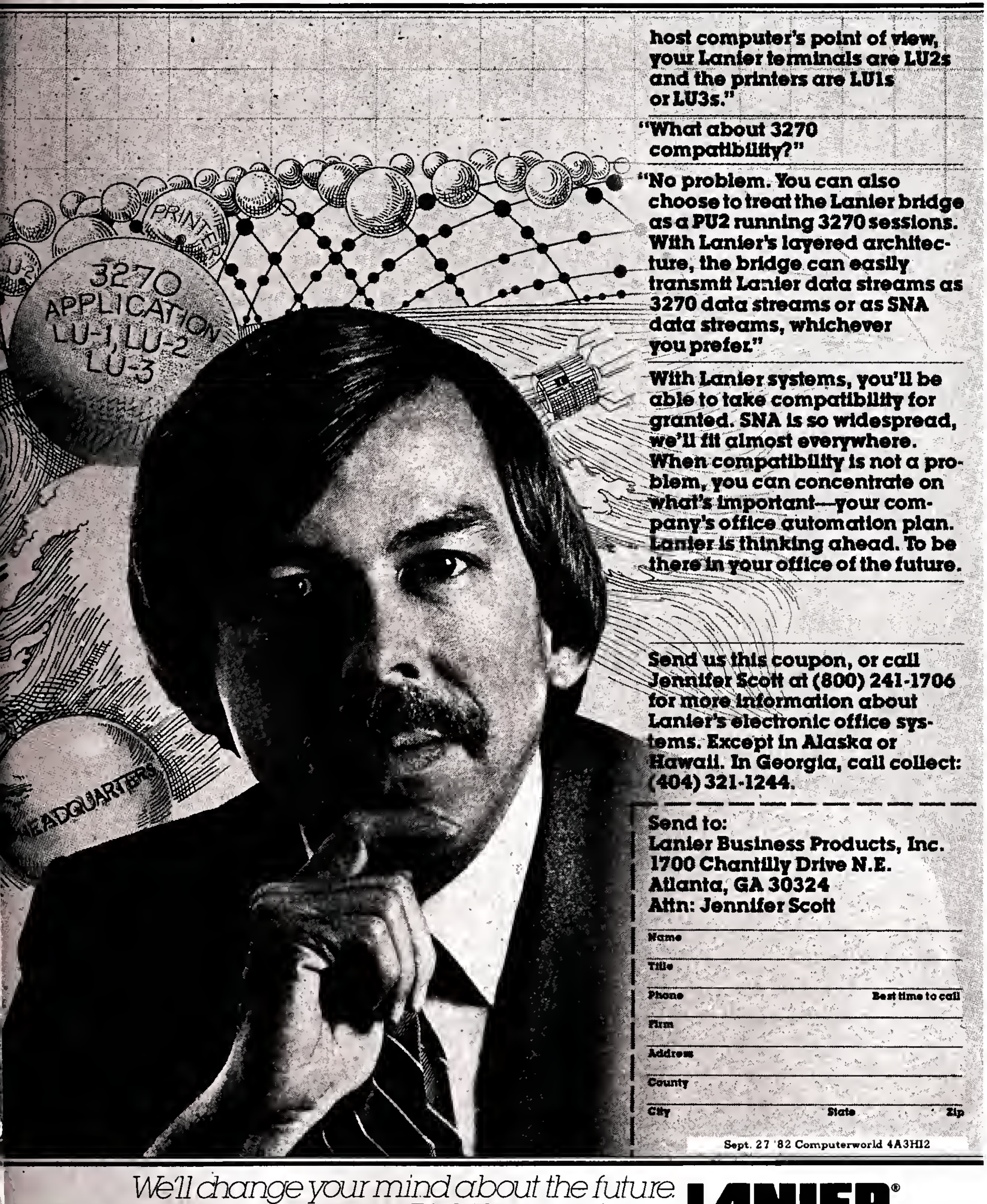
DANVERS, Mass. — John Wurts believes his company's decision support system (DSS) "has just scratched the surface of helping people get the most out of their data."

Wurts, the 34-year-old president of Management Decision Systems, Inc. and developer of the Express Decision Support System (DSS) language, made this statement at the Express User Group International Conference here recently.

Wurts said he developed Express as the result of three things:

- He wanted to get computers to think like people, as opposed to getting people to think like computers.
- He wanted, at all costs, to avoid ever again having to complete the lengthy analyses necessary to completing a marketing project in his days at MIT.
- He wanted an innovative project to pursue when he joined the Ph.D-laden staff of Management Decision Systems.

As for the future of Express, Wurts hopes it will impact corporate decision making around the world and "help the Western World improve its economy so we can keep some of the things we know and love."



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Marvin Gaines, Director, Data Communications, Electronic Office Systems Division

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Handbook Details U.S. Information Policy

WASHINGTON, D.C. — Information policy in the U.S. is extensively documented and discussed in a new handbook from the Information Industry Association.

The comprehensive four-volume, 1,300-page publication, *Understanding U.S. Information Policy: The Infostructure Handbook,* covers what handbook editor Forest Woody Horton Jr. calls the "players," "stakes" and "arenas" of information policy from political, economic and social perspectives.

The first volume, *The Information Policy Primer,* serves as an executive summary and overview of the three main volumes:

- *The Resources of the Information Economy* deals with technologies and productivity in the information age and with information management.
- *The Participants in the Information Marketplace* covers property concepts, including copyright and property rights and the role of government and international players such as "Japan, Inc."
- *The Assets of the Information Society* analyzes public interests, knowledge centers and the future.

Nine Policy Areas

The three main volumes consider nine information policy areas as they relate to 20 different "data sets" — everything from congressional initiatives, agency programs, trade associations and labor unions to U.S. academic and research institutions, U.S. and foreign periodicals and sources of information. The handbook has more than 5,000 entries.

Prior to Sept. 30, the handbook is available at a prepublication price of $39.50 for a single book, $59.50 for two books or $79.50 for the four-volume set. The $25 primer is included at no charge with the purchase of one or more of the three main volumes.

After Sept. 30, the prices will be $49.50 for one volume, $74.50 for two volumes and $99.50 for the complete set.

Order forms and more information are available from the Information Industry Association, Suite 400, 316 Pennsylvania Ave. S.E., Washington, D.C. 20003.

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Firestone Moves to DSS

(Continued from Page 23)

on-line demonstration DSS systems to enable hands-on DSS processing.

DSS training at Firestone consisted of one-on-one coaching sessions, comprehensive documentation with lots of examples, on-line help features, telephone hot line user support and on-line product enhancement announcements.

Good and Bad News

The implementation has meant some good news and some bad news, Bode summarized. The good DSS news was the fact that the company had a solid base system in place, the executive training and acceptance looked promising and he argued that the alignment of DSS and corporate objectives would serve to solidify the company's position in the marketplace.

The bad news, Bode said, was that overexpansion of DSS could act to impede the system's ability to respond quickly, getting increased volumes of data on to the system is difficult and the responsibility of data base administration is an issue that must be resolved. Specifically, he recommended that this responsibility should not be that of the management information systems director.

But the results of this implementation were largely positive, Bode maintained. By the time the system went up, the executives were comfortable with the terminals and the DSS process, their expections of the implementation were quite realistic and the users understood the importance of taking the time to learn the system.

According to Bode, Firestone's DSS plans are:

- To expand DSS usage in the analysis of data (graphics capabilities and so forth).
- To expand user groups along the line of internal strategic interests in the company.
- To integrate DSS with other office systems such as word processing functions.

NCR Reference To Products Out

DAYTON, Ohio — NCR Corp. has announced its Consultant's Reference Library, a three-volume guide to NCR products and services.

The systems volume covers NCR's general and special-purpose systems, including hardware and software summaries, communications capabilities, environmental requirements, educational offerings and costs.

The terminals and peripherals volume covers terminals, printers and storage and micrographics devices.

The basic and applied software volume details NCR operating systems, utilities, data base management systems, transaction processing monitors and application packages.

The Consultant's Reference Library will be updated regularly in the form of complete replacement or new packets. The yearly fee is $85, including three volumes and updates for a year from Consultant Relations, NCR, USG-3, Dayton, Ohio 45479.

U.S. Reluctantly Joins UN Data Flow Study

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The U.S. has reluctantly agreed to participate in a study of transborder data flows being conducted by a United Nations agency generally viewed here as an unfriendly forum for considering high-technology issues.

The State Department last week unveiled a working outline for a data flow paper the government will produce for the UN Centre on Transnational Corporations (CTC), which in the last year has accelerated its work on this sensitive information policy issue.

Although many U.S. corporations feel the CTC, as a champion of developing nations, is hostile to their goals and modes of operation, the State Department evidently has acknowledged that the UN agency's work program can no longer be ignored by the U.S., which prefers to pursue transborder data flow debate in forums more representative of developed countries, such as the Paris-based Organization for Economic Cooperation and Development (OECD).

Until recently, the U.S. downplayed the CTC study, fearing the centre's work might lead to a data flow code of conduct for multinational organizations [CW, Oct. 12, 1981]. But now, according to Teresita Schaffer, director of the State Department's Office of International Trade, the CTC study has been significantly legitimized by the decision of several Western nations, including West Germany and Canada, to participate.

Schaffer also noted that a recently completed data flow paper from Brazil espouses a decidedly nonfree flow approach to the subject, which the State Department feels should be rebutted by the U.S. At a meeting of the department's private sector advisory group on transborder data flows last week, it was also argued that CTC is not at this time working toward a data flow code of conduct.

Advisory group chairman Hugh Donaghue, of Control Data Corp., said his contacts with the CTC persuade him the center is now "beginning to realize we know very little about this subject." The agency is, for the time being at least, more interested in studying the matter than in developing a set of guidelines for data flow, he said.

He also argued that the U.S. has been overtaken by events and can no longer afford to ignore the CTC work and try instead to pursue this subject in more favorable organizations. "The world's going to move on whether we want to or not," he observed, saying the U.S. "would be doing well" to make its feelings on data flow known to the CTC, especially in light of the Brazilian paper.

There continues to be concern among U.S. firms about the undertaking, however. Dick Harris, the Xerox Corp. representative to the advisory group, said he is "uncomfortable" with the U.S. approach to the CTC undertaking.

"I am really upset about the haphazard way in which I see it being done," he said of the U.S. effort. "I do not see a solid commitment [by the government]; I do not see resources being applied."

Schaffer acknowledged that the U.S. has not decided which agency will lead the effort to develop the position paper and does not know if it can commit full-time staffing to the project. She promised, however, to develop a more organized approach to the project as soon as possible.

According to the draft outline for the paper, it will cover philosophical underpinnings of U.S. national and international data flow policies; the importance of data flows to the U.S. and the world; discussions of U.S. policies on telecommunications and informatics; and case studies from various economic sectors, including financial and DP services.

While pursuing this effort, the U.S. continues to defend its interests in the OECD, which in a series of meetings late this month is moving ahead with its consideration of the legal and economic aspects of transborder data flows and other topics.

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Zip+4 to Sharply Reduce Bulk Mailer's Costs: Bolger

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Adoption of the nine-digit Zip Code will cut bulk mailers' costs significantly, Postmaster General William F. Bolger said here recently at the National Postal Forum.

In addition, Bolger reported the next increase in postal rates has been delayed because of an improvement in the Postal Service's balance sheet.

Adoption of the nine-digit Zip Code will enable bulk mailers to automate their own operations further and, meanwhile, will more than double the savings that the Post Office will reap from the automation of its operations, Bolger said. He called upon mailers to "step back and see this issue for what it is — an issue that will determine our future ability to continue to control our costs and hold down your rates.

"Automation represents the single most important step that will keep our mail processing system economical and affordable well into the next decade and beyond," Bolger continued.

Earlier this year, Congress put off implementation of nine-digit Zip Codes until October 1983. "And now," Bolger said, "there are people saying, 'Wait two or three more years and it won't be necessary at all — we'll have a sophisticated [Zip-Code] reader capable of doing all of the sorting down to a carrier route without Zip+4.' "

Big Drawback

The big drawback of this equipment, Bolger said, is that it will not be available for at least two years and will be four to five times more expensive than the optical character readers that the Postal Service is now acquiring to read nine-digit Zip Codes.

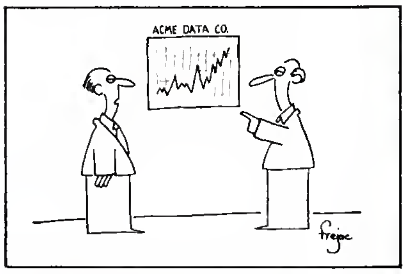
The postmaster general made a similar plea for retention of the private express statutes, which have been under attack recently from vendors of electronic message services.

"I am sure that many of you could find cheaper ways to get much of your better mail delivered if the statutes were repealed," Bolger said, "but what about the rest of your mail?"

It would be "a whole new ball game" if the private express statutes were repealed, he added. Unless the Postal Service were allowed to compete "head to head and unfettered in a deregulated atmosphere" or "our competition were required to compete head to head with us as fettered as we are in a tightly regulated atmosphere, the Postal Service as you know it today would be dramatically curtailed."

To underline the savings obtainable from automation, Bolger reported that the next general increase in postal rates, originally scheduled for late 1983, has been put off until "January or February 1984 at the earliest." He attributed the delay to a surplus of $612 million, which the Postal Service earned during the past several months.

A 3.7% increase in productivity, due primarily to automation, is one reason for the surplus, Bolger explained. A higher-than-expected increase in mail volume and a lower-than-expected increase in inflation were the others.


ACME DATA CO.

'It Doesn't Mean Anything. The Interior Decorator Selected It.'

Office Automation Conference Set for Feb. 21-23 in Philadelphia

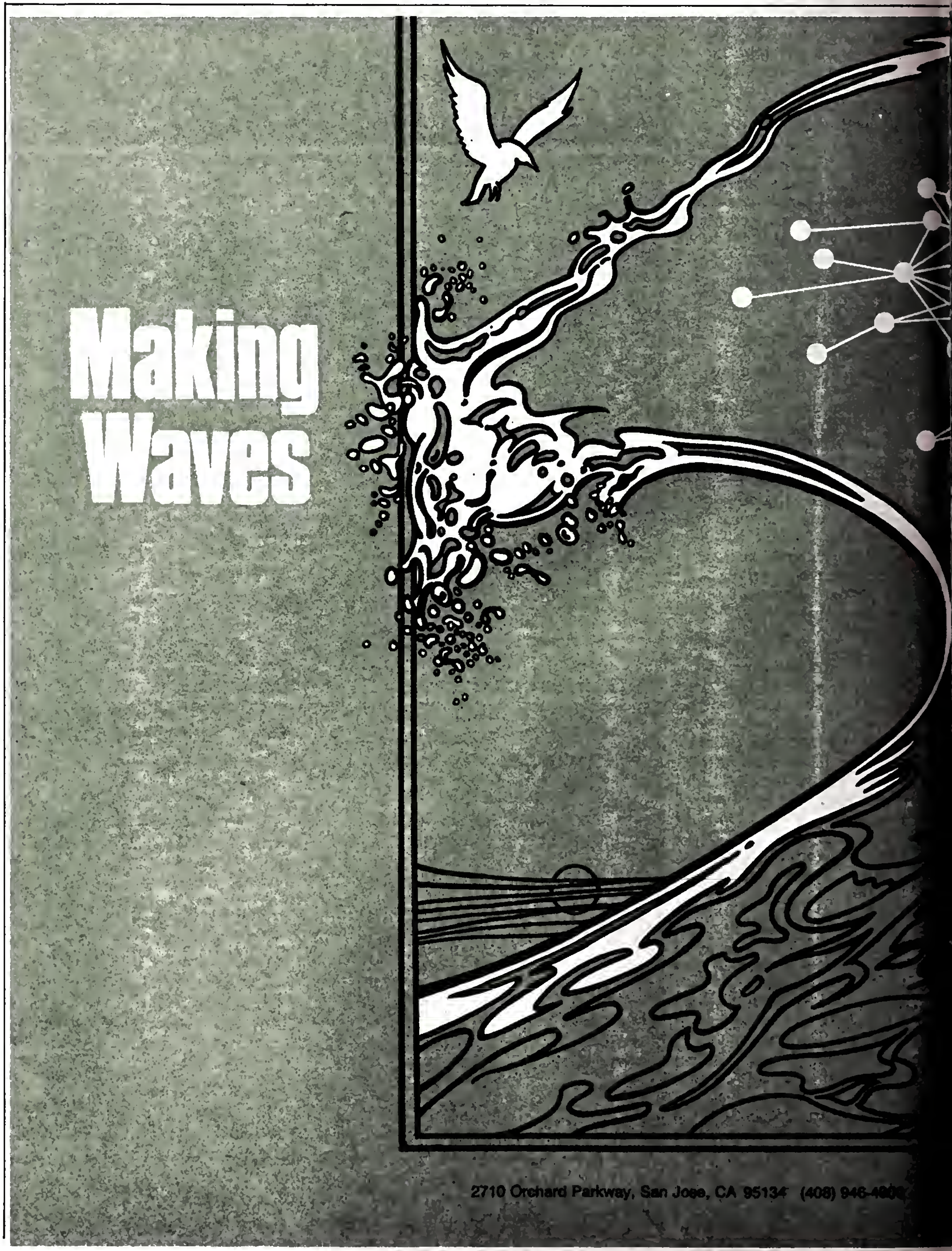
PHILADELPHIA — "Explorations in Office Automation" will be the theme of the fourth annual Office Automation Conference scheduled to be held at the Philadelphia Civic Center here on Feb. 21-23. The conference agenda will include a keynote session, 54 technical sessions and four industry workshops, in addition to exhibits by more than 125 manufacturers, consultants, associations and software suppliers.

According to the conference sponsor, the American Federation of Information Processing Societies, Inc. (Afips), the technical sessions will fall within six program areas: "Advanced Office Technology," "Communications," "Current Office Technology," "Human Factors and Social Issues," "Management and Organization Issues" and "Systems Integration."

"The Information Management Plum — Who Gets It?" will be the theme of a debate on Sunday, Feb. 20, from 6 p.m. to 7:30 p.m.

Advance registration fee for the full conference is $100, with a single-day rate of $40. On-site registration is $125 for the full conference. A special full-conference student rate is $10.

Afips is located at 1815 N. Lynn St., Arlington, Va. 22209.



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Consumer Resistance

Grocery Silences Talking Registers

BOSTON — Shoppers at a supermarket operated by Stop & Shop Co., Inc. in Lexington, Mass., will not be forced to hear "talking" cash registers announce the prices of their purchases anymore.

Consumer resistance to the eight talking units, in operation on a test basis at the store since last December, forced the large supermarket chain to unplug National Semiconductor Corp.'s Positalker voice units from its checkout system, a Stop & Shop spokeswoman said.

Ironically, Lexington is one of the towns in the hub of Massachusetts' high-technology area.

Customers thought the installation of the electronic devices would result in an increase in their grocery prices, and they did not like the voice emanating from the box-like device hooked into the electronic scanning system, she noted.

However, the supermarket chain is not giving up on the voice devices and will probably install them in some of their Connecticut stores.

Despite resistance by Massachusetts consumers, National Semiconductor reported it has not had similar problems in any of the other markets where Positalkers are chatting, according to the spokeswoman. Currently, 185 stores are using the talking units, with an average of eight to 10 lanes per store utilizing the devices, she maintained.

The voice units, which cost $350 apiece, assist checkers who customarily call out the prices as they ring up the items, the spokeswoman explained. However, the speed of new electronic scanning devices are too fast to permit the checker to call out the price of the grocery items, so the talking device, which only announces the price of the item, was added to the check out system as a specialized application.

National Semiconductor's research has shown the devices do not result in added prices to supermarket customers.

Workshop On Writing RFPs Set for D.C.

ROCKVILLE, Md. — RFP, Inc. has announced its 1982-1983 schedule for the "RFP Writer's Workshop: Contracting for Information Systems, Library Operations, Database Development, Dissemination Services."

The workshop will be conducted in Washington, D.C. on these dates: Nov. 4-5, Jan. 13-14, March 3-4 and May 5-6.

The workshop is directed to middle-level managers responsible for preparing requests for proposals, evaluating proposals or monitoring contracts in the information field, a company spokesman reported.

Topics covered by the workshop include roles and functions of requests for proposals, distinctions between contracts, evaluation of proposals and contract performance and legal aspects.

The registration fee is $325 for a firm's first registrant and $275 for additional registrants.

RFP is at 6000 Executive Blvd., Rockville, Md. 20852.

RFP is at 6000 Executive Blvd., Rockville, Md. 20852.

Datapro Offers Suppliers Guide

DELRAN, N.J. — Datapro Research Corp. has released its 1982 "Directory of Over 1,000 Suppliers," a report said to provide financial and product information about 1,095 companies offering DP products and services.

The report focuses on the financial stability of the companies listed, described by a Datapro spokeswoman as a factor that users should weigh heavily in choosing a DP vendor. The listings appear in a column format, providing information about each company's location, size, names of executives, international sales and marketing activities and products and services.

The directory will also include gross sales and net earnings figures for the latest fiscal year, the spokesman said.

The 116-page directory costs $29 from Datapro at 1805 Underwood Blvd., Delran, N.J. 08075.

'Micro vs. Maxi' Theme of Ceda Meet

SAN DIEGO — The California Educational Data Processing Association (Ceda) will hold its annual convention at the Hotel Del Coronado here Nov. 4-5. The theme of this year's meeting is "Micro vs. Maxi Act II."

Topics to be addressed include the use of computers in education, information resource management, office automation systems, educational support systems and connectivity, according to a release.

More information can be obtained by contacting the Office of the Los Angeles County Superintendent of Schools, Data Processing Division, 9300 E. Imperial Highway, Downey, Calif. 92042.

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OTA Ties Education's Future to Computers

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The U.S. educational system will flourish or perish depending on how well it exploits computer technology, congressional researchers said recently.

Reporting on a two-year study of information technology's impact on U.S. education, the Office of Technology Assessment (OTA) told Congress that not only is the information age making enhanced educational systems vital to our society, but future education can be effective only through better use of information technology.

"If we are to meet the educational challenge presented by the advent of the information society, we will need a comprehensive set of policies that take into account the changing needs of education and training, the need to assure equitable access to educational opportunities and services and the changing roles of the institutions responsible for providing education and training," OTA Director John H. Gibbons said.

Gibbons told the House of Representatives Education and Labor Committee on Sept. 14 that it is clear that even now the nation's educational needs are not being met. Fast-changing computer technology and the growth of the information economy will create a situation in which lifelong education will become the norm for many people, he said.

It is already evident that traditional educational institutions such as schools, libraries and museums, "may be unwilling to adapt to meet the changing educational needs of society," according to Gibbons. He suggested the provision of these services through the marketplace may mean some national educational goals may not be reached or education may become less accessible to certain segments of society.

There is an "urgent" need for policies on education in the information age, he concluded, saying OTA feels that the current situation, if not corrected, could eventually "impede the nation's economic growth, undermine its international competitive position and increase and exacerbate the socioeconomic divisions within society."

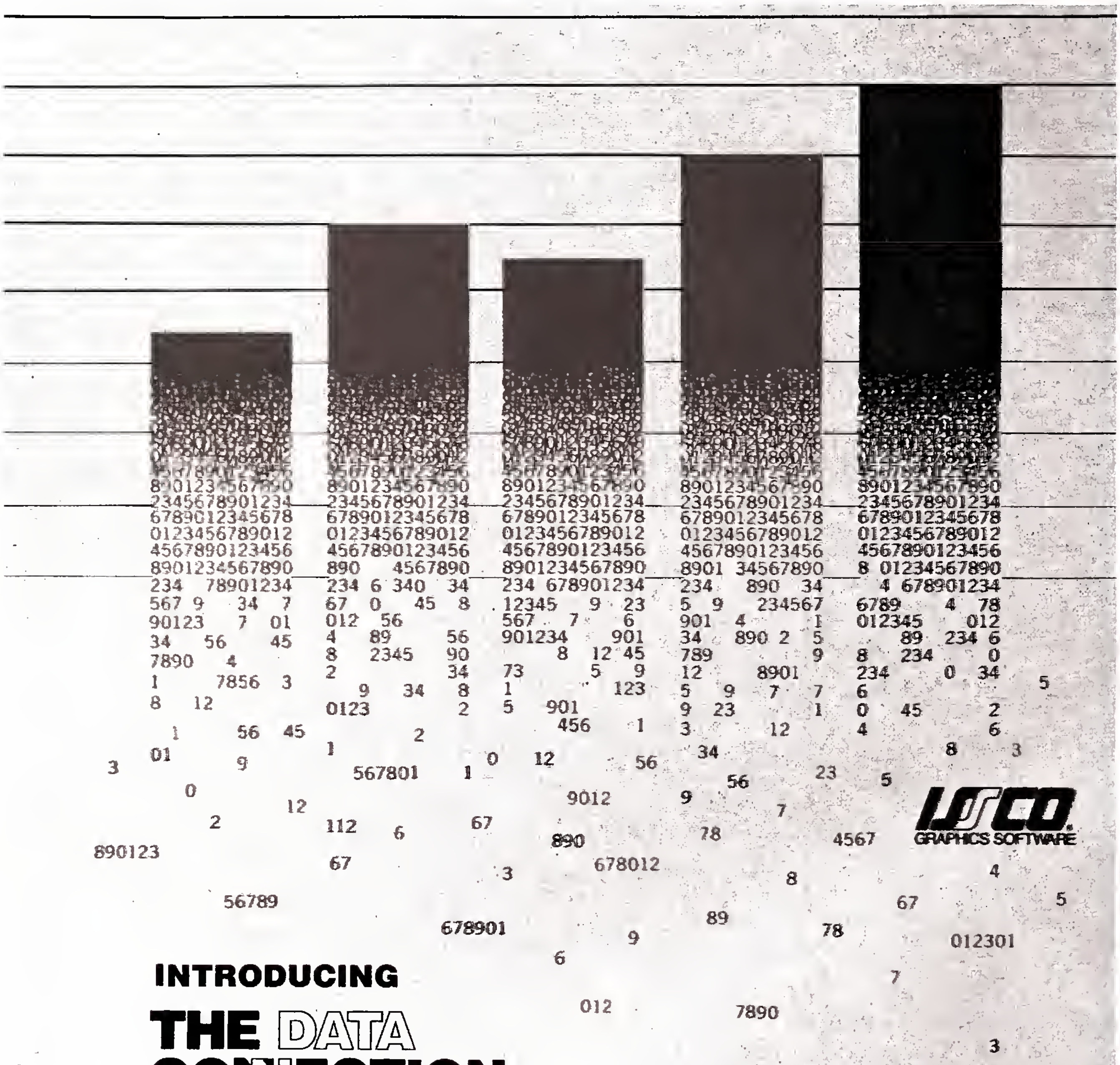
Promising Mechanism

Declaring that "the new information technologies offer a promising mechanism, and in some cases the only mechanisms, for responding to these educational needs," Gibbons suggested several areas in which it might be appropriate for the federal government to play an active role in fostering computer use in education. Congress could, he said:

- Encourage the use of educational technologies for manpower training and retraining.
- Act to insure equitable access to information technologies.
- Provide tax incentives for donations of computers and other information technologies to schools or directly finance technology acquisitions by educational institutions.
- Subsidize software development or act to reduce the risks entailed in its production.
- Finance demonstration projects and teacher training programs.

One vital component of any national strategy, OTA suggested, is research in the areas of learning strategies and cognitive development, development of effective and economical curriculum software and long-term psychological and cognitive effects of using educational technologies.

On a more general level, Congress, in designing all educational legislation, should pay more attention to encouraging the most effective and economical technological alternatives to current programs, Gibbons said. "Moreover," he added, "in areas not directly related to education, such as telecommunications, the Congress could, when formulating new policy, make a greater effort to take educational factors into account."



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U.S. Schools Seen Needing Millions To Keep Up With Information Age

WASHINGTON, D.C. — There is only one cure for the current technological anemia of U.S. schools: money — and lots of it. Congress was told recently it should spend hundreds of millions of dollars to bring the U.S. educational system into the information age.

Flatly rejecting the fear that, as one congressman said, teachers will become obsolete and students "computerized zombies," witnesses at the Sept. 14 hearings on educational technology said computers and information technology are the only hope for modern education.

Dr. Francis Dummer Fisher of Haverford College said development of effective educational software is the most pressing of hardware, software and training needs. Unfortunately, Fisher concluded, private enterprise cannot be reasonably expected to invest the money necessary to develop courseware.

This work "must be supported by government," according to Fisher, who suggested that "a research and development effort in electronic courseware of $100 million a year . . . is a safe starting point."

Dr. Linton Deck Jr. of the Fairfax County, Va. school system called for the establishment of public/private consortia for software development, which could be nurtured by congressional action to at least double the estimated $10 million now spent annually on courseware research and development in this country.

To support schools' acquisition of educational software, Deck said approximately $20 per student should be provided — about $50 million per year for each of the next five years. Deck figured an adequate program for developing and acquiring educational software could total $350,000 over the next five years.

ASI Releases 29 CAI Courses

ARLINGTON HEIGHTS, Ill. — Advanced Systems, Inc. (ASI) has announced the release of 29 new computer-assisted instruction (CAI) courses. These courses are said to cover topics such as CICS/VS, TSO, structured Cobol, MVS dumping concepts, MVS system operator training and IMS.

All courses are based on the IBM Interactive Instruction System (IIS) and are compatible with any hardware that supports IIS or Phoenix by Goal Systems International, Inc., according to ASI.

The CAI courses include three facilities: placement, exercise/simulation and mastery/review. Each facility is menu-driven with user-friendly explanations and responses to questions.

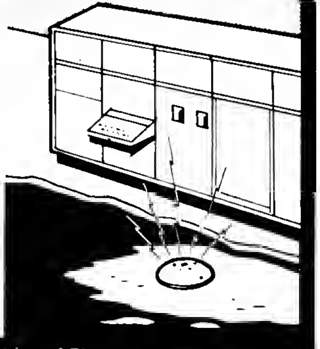
The cost is $50 to $100/course, depending on the size of the lease agreement. For further information, ASI can be reached at 2340 S. Arlington Heights Road, Arlington Heights, Ill. 60005.

Texas School Offers CAD/CAM Guide

ARLINGTON, Texas — The University of Texas at Arlington has announced a "CAD/CAM Presentation Resource Guide."

The guide reportedly covers topics relating to computer-aided design and process planning, group technology and manufacturing management systems. The material is published in loose-leaf form as full-size vieugraph masters that may be reproduced for use in presentations.

The 339-page guide was prepared by the automation consulting firm of Link & Associates. It costs $125 from Cindy Marshall, Office of Continuing Education, The University of Texas at Arlington, 528 Campus Center, Arlington, Texas 76019.



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Utility Finds Power to Spare When It Installs On-Line System

BOSTON — The utility business is built around efficient customer service, which is one reason Eastern Utilities Association (EUA) updated its older computer system by installing an on-line, real-time customer information and accounting system.

And, in making that move, it was reportedly able to diversify into the DP services business, offering excess capacity on its older system to smaller utility companies.

EUA is the parent company for two retail electric companies, a wholesale generation and transmission company and a service company, serving nearly a quarter of a million customers in southeastern Massachusetts and northern Rhode Island.

While it is not unusual for utility companies to have on-line systems, the firm considers it somewhat out of the ordinary to be operating in a real-time environment. A primary reason for opting for such a system was to expedite its cash flow from bill payments to interest-earning bank accounts, a spokesman explained.

EUA, through its data processing subsidiary EUA Service Corp., had started to build such a system when it installed a Honeywell, Inc. 66/10 multidimensional computer system with software built around customer information, accounting and new-service order processing applications.

Then in 1980, EUA began integrating its customer service applications with other functions, such as meter operations, transformer load management and constuction management. To do so, the utility company acquired a Honeywell dual Model 66/20 system.

Extended Capacity

Along with the extended computer capacity and with some 100 on-line terminals tied to the system, customer service representatives, engineers, repair crews and management are now able to communicate with the central computer, according to Normand R. Tanguay, EUA director of systems and DP. "The entire customer service function is governed by the Honeywell communications system," he said.

As a sidelight to the upgrade, there has been a move toward diversification into the DP services business. When the new system was installed, the older system was transported to EUA's Lincoln, R. I., office where it was set up as a backup unit. However, utilization of that system was low, so Tanguay began investigating the possibility of marketing the computer's excess capacity and EUA's service products.

"Most utilities are finding a need to diversify their basic electric business," Tanguay said, but most of the others have gone into oil exploration or consulting services rather than DP.

EUA is marketing three computer products. It is offering its computer in the Lincoln center as a backup system for smaller firms that have Honeywell gear. In addition, it is providing its customer services software to other utilities and offering time-sharing services for processing billing operations for other electric utilities.

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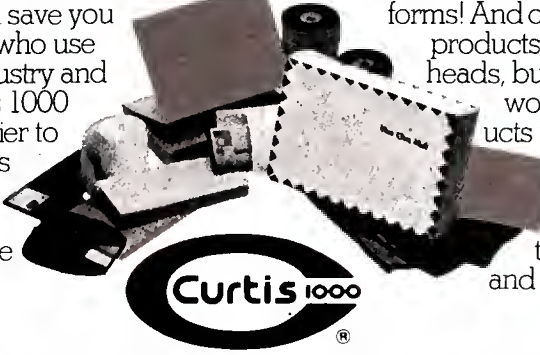

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Cambridge Goes In-House to Keep Up-to-Date

CAMBRIDGE, Mass. — The home of Harvard and MIT had been struggling since 1979 with information that was 30 to 60 days out-of-date because the city of Cambridge did not have an on-line accounting and budgetary control system.

All data processing was performed by an outside service bureau, but in 1979 the city began considering the advantages of developing in-house capacity and commissioned a study on in-house DP.

Finally, last July, on the heels of Proposition 2½ — a tax-cutting measure similar to California's Proposition 13 — the city decided to act. It installed a minicomputer.

"We were afraid of making a substantial capital investment in equipment that might become insufficient as our needs expanded," Deputy City Manager Richard Rossi explained.

"Nevertheless, we were fully aware of our need for timely and accurate budget data in order to best manage the city's finances. Proposition 2½ intensified that need, and we knew computerization was ultimately the answer," he said.

When the city's service bureau announced last summer that it would go out of business on June 30 of this year, city manager Bob Healy decided that Cambridge should have a computerized accounting and budgetary control system up and running on July 1.

Core Package

The city decided to start with a core accounting package and add special application subsystems later on as funds for system expansion became available. It formed a selection committee consisting of 15 employees from various levels of management and engaged a consultant with a Boston-based management consulting firm, Bremer Associates, to help in the selection process.

The committee read a number of proposals and narrowed its choices to four or five government accounting packages, offered by several of the large national certified public accounting (CPA) firms, and hardware offered by the major vendors. The committee chose Main Hurdman's Total Accounting for Governments' (TAG) software package and Sperry Univac's System 80 mainframe.

Healy listed the advantages of the package: "The TAG package provides current budget information, automates our bookkeeping functions, is designed specifically for the fund and encumbrance accounting used by local governments, required no major modifications to customize it to our city, will interface with any subsystems we add later and seems easy for nontechnical staff to learn."

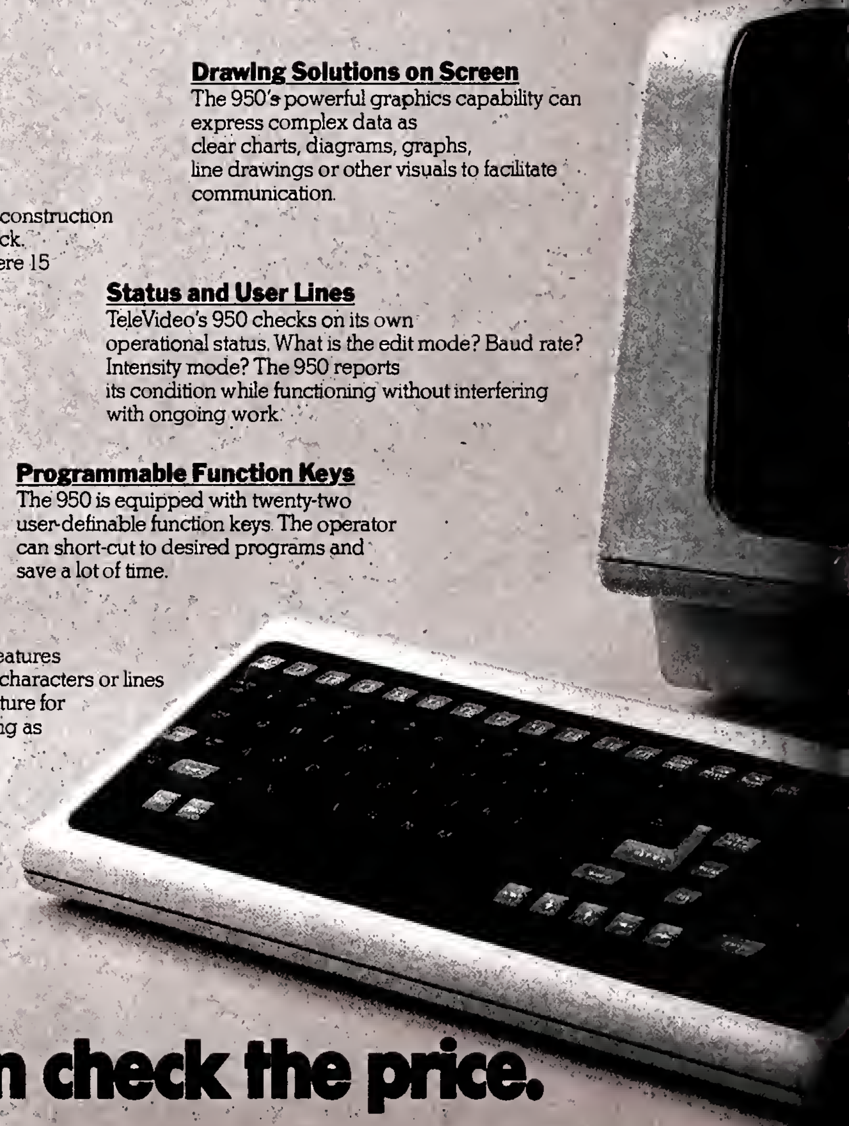
The System 80 is a business computer with 1M- to 4M bytes of memory in the processor and 119M bytes of fixed-disk storage with expansion ability up to 1G bytes, a Main Hurdman spokesman said. The TAG package is fully on-line and interactive and is programmed in Ansi 74 Cobol.

Cambridge's 120-day conversion was not without its difficulties. City department managers had to work closely with Budget Director Louis DePasquale and Main Hurdman CPAs to set up a new system of accounts and object codes. Certain changes in the work flow were also required.

Healy is looking ahead to system expansion. With the processing cost savings from the core accounting and budgetary control system, Healy expects to install a special application subsystem — either a payroll, a tax receivable or real estate assessment — within the next 12 months.

"We've got all the system we can handle at this point," Healy said, "and we purchased software and hardware designed for flexibility, so we can easily add on to it later without starting from scratch.

"TAG and System 80 is the city's first move towards computerizing our informational environment, and we're going to take the future step by step," Healy observed.



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Success Leads to Spin-Off

Munson's Reps Take Terminals on Sales Calls

COSTA MESA, Calif. — In the wholesaling business, where turnaround time is everything, a computer is helping a sporting goods wholesaler here reduce order entry time and speed shipments to the customer.

Munson Sporting Goods is using a direct order entry system to ship equipment to its more than 3,500 customers within 24 hours of receipt of order, even when the data comes from as far away as Alaska. The system has been so effective that Munson has spun off a separate division that advises wholesalers and retailers on ways to improve their inventory and order entry operations.

The system, supplied by Processing Innovations (PI) of Anaheim, Calif., is based on a Hewlett-Packard Co. 3000 processor utilizing Azurdata, Inc. hand-held terminals and speech-aided modems (SAM) from PI.

Central Warehouse

Munson is, in effect, the central warehouse for an independent network of 3,500 retail stores on the West Coast, with outlets stretching from Alaska to New Mexico and west to Hawaii. According to Ken Roberts, Munson's controller when the system was installed and now president of the computer spin-off, the system allows a sales representative to process orders directly from the customer location.

A Munson sales representative enters order information into a hand-held terminal he carries to the store. At the end of the day, he phones the warehouse directly for product availability information and then transmits the order. At the warehouse, central computers automatically compile packing slips, credit and sales reports and other documentation. The order is then confirmed and shipped within 24 hours, Roberts said.

Previously, the company used a courier service to deliver handwritten orders from its representatives to the warehouse. The orders had to be checked, recapped and manually entered into the computer, a process that could take as long as three days.

Under the new system, Roberts said, response time has been dramatically reduced, a factor which has played a major part in the 300% growth rate the company boasts.

Speech Synthesizer

Sales representatives have welcomed the system's speech synthesizer, a SAM function that confirms receipt of the order in human terms like "Data OK. Thank you" or "Data error. Please send again." Roberts said the synthesizer has eased the transition to computer technology for those representatives who are unfamiliar with DP.

The success of the direct order entry system has led to the creation of Munson Management Systems, a spin-off headed by Roberts that helps retail and wholesale firms set up similar order entry and inventory systems.

Roberts said the system could help individual stores recap daily sales totals and report inventory needs in five to 10 minutes, a process which now can take as long as three weeks.

SAM works with most central computers and supports hand-held equipment from Micronics International, Inc., MSI Data Corp., Norand Corp. and Telxon Corp. Software adjusts for different parities automatically, making a combination of different terminals possible, a vendor spokesman said.

A SAM unit similar to that installed at Munson Sporting Goods — with a full-size CRT and keyboard, Zilog, Inc. Z80 CPU, 64K bytes of dynamic random-access memory, speech synthesizer, receive software and self-test diagnostics — lists for about $5,000, according to the vendor spokesman.

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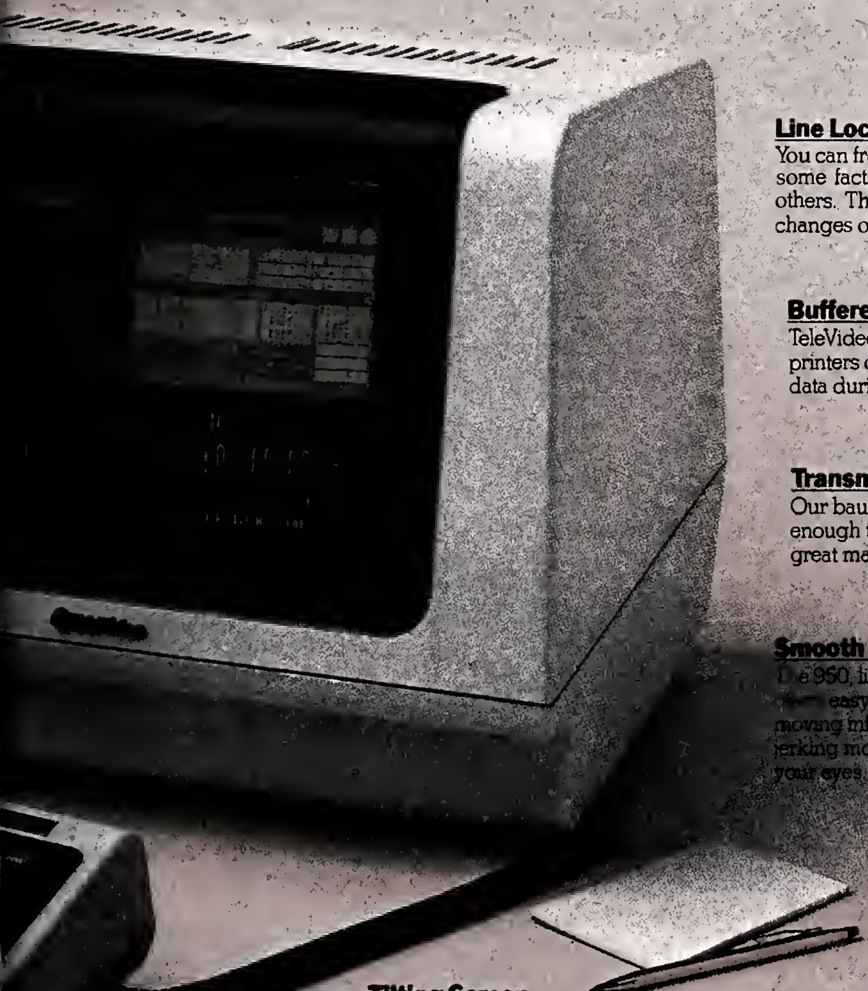

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Mortgage Firm Houses Data on Microfiche

PHILADELPHIA — Despite soaring interest rates, Colonial Mortgage Service Co. here has found a way to make your mortgage look small — it stores the mortgage data on microfiche.

The firm recently upgraded its 10-year-old computer output microfilm (COM) system by switching to a microfiche format. The firm installed an Eastman Kodak Co. Komstar 200 micro-image processor as an on-line enhancement to the firm's two IBM 4341 processors, according to Colonial Mortgage Vice-President Gerald R. Longworth.

"We had been furnishing marketing reports to our 30 branches throughout the country and keeping archival records on 16mm microfilm. Because of the compactness and [the ease of] indexing available on microfiche, we felt this output format would give us quick access to information that would be cheaper and faster to duplicate," Longworth said.

Conversion From Paper

The original COM application was a conversion from a paper environment. As a financial operation, the firm generates a lot of data, Longworth explained. Some of that data, such as daily transaction journals and some historical files, are sent out to the branch offices. Other data, such as mortgage servicing records and updated customer listings, is retained for archival use, Longworth said.

"Mailing paper copies of the reports would be prohibitively costly. And if we had to keep the archival reports, which are often used as a research tool, we would probably have to build another file room," Longworth said.

When the 10-year-old microfilm device wore out, Colonial decided not to replace the unit with another device that used chemicals to process the film. "The laser-imaging systems of the Komstar unit gave us the reliability and image quality we wanted without the additional cost of handling chemicals. We are also convinced that the dry-silver microfilm is stable enough to meet our archival requirements," Longworth said.

The Komstar unit is installed in Colonial's computer room, where it operates much like a printer. The laser unit is transparent to the 4341 processor and the Komstar unit can process both microfiche and, when necessary, 16mm microfilm, Longworth said.

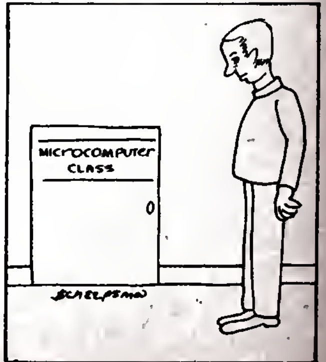
Since the older COM system was designed for an IBM 370 series mainframe, Colonial Mortgage had to go through a one-month conversion process.

Nasis Installs Jack Stanton As President

LEXINGTON, Ky. — The National Association for State Information Systems (Nasis) has installed Jack Stanton as president. Stanton, the Arizona state automation director since 1975, has 16 years' experience in the data processing industry.

Stanton served in 1971 as national president of the Highway Engineering Exchange Program, an organization devoted to mutual support of state highway DP activities, and has served as Nasis committee chairman, as a regional director and secretary-treasurer, a Nasis spokesman said.

Nasis made the announcement of Stanton's installment at its annual meeting held here recently. Other officers for the coming year include Jim Heck of North Dakota, president-elect; Joseph Banville of Massachusetts, secretary-treasurer; and George Patton of Rhode Island, immediate past president.



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Truck Stop Takes Account Of Food, Gas, Novelties With Inventory Control

HEBRON, Ohio — A computer that pumps gas, waits on tables and tends the counter at a gift shop? Not yet. But at the Ohio 70-37 Truck Stop here, a computer system keeps track of the gas, food and novelty items sold.

This truck stop is more than just a place to get a cup of coffee, its general manager and president, Charles H. "Buzz" Price, said. It includes a 165-seat restaurant, a retail store that sells novelty and other items for travelers and a gas station that pumps 300,000 to 400,000 gallons of fuel each month. A service department repairs a variety of vehicles and keeps a stock of spare parts. And the truck stop's most recent addition, a 16-unit motel and carryout food business, is located across the street.

"We're a 24-hour-a-day, 365-day-a-year business serving between 15,000 and 20,000 customers each week," Price said. Before acquiring a 65K-byte Wang Laboratories, Inc. 2200 MVP processor with three terminals, a Wang 2280 disk drive, a 2261 printer and seven Data Terminal Systems, Inc. 515 cash registers, the organization did not have a centralized inventory control system. Employees in each section kept inventory records either by stapling tickets together or by marking tally sheets and sending them upstairs to the firm's office.

Cash receipts were totaled manually and then sent to the office. "We often found discrepancies in inventory count and cash totals," Price said. "They had to be redone and rechecked until the error was located," he added.

Accounting Functions

Accounting functions were another problem: Price said general ledger and payroll accounts were handled by an outside accounting firm. The office staff at the truck stop, however, spent four days every month typing checks and invoices.

In addition, the manual system often gave rise to errors, which slowed the turnaround time, Price said.

The manual system also posed an inventory problem. Since there was no real way to check inventory quickly, it could take several months to find out the business was losing money in a given area. Furthermore, Price continued, management decisions were often made with incomplete or inaccurate data.

Looking for a computer system, Price said, was a frustrating procedure: "With some companies, it was all or nothing. They offered a set system, with little allowance for modification. Other firms kept adding onto their basic models until what I wanted was ridiculously overpriced."

In 1979, the firm purchased the Wang 2200 processor and hired Applied Cybernetics Co. from Columbus, Ohio, to create the software for the system. The hardware cost about $50,000, but the user has already paid for the processor in terms of time and monetary savings, Price said.

The processor handles inventory control functions by linking each of the Model 515 cash registers with the Wang processor. When a sale is recorded, information such as the item, amount sold, price clerk number and date are entered into the processor. The Wang processor polls the registers twice a day. The information is stored, by department, in the processor's data base.

Registers for each operation were designed for that operation's special needs. For example, restaurant personnel punch orders into a "precheck" machine, which automatically totals a customer's bill, Price noted.

Inventory Status

"The computer can produce information on the status of all inventory. We can compare stock levels with that of previous months or years. We can check for availability of seasonally popular items, [and] we can tell how much of any given item we have sold," Price said.

The firm can also use inventory and sales records to reflect employee productivity.

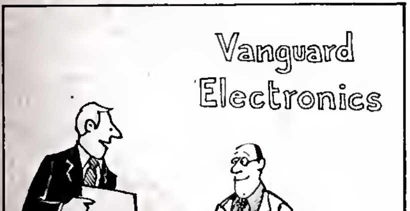
"If someone isn't properly trained, his mistakes are immediately spotted on the automated reports. Conversely, super salespeople can also be identified," Price said.

Better Cash Flow

By installing the system, the truck stop no longer uses a full-time accounting firm. Price contended that the system's accounting package maintains a better cash flow and that accounts payable and accounts receivable are issued weekly instead of monthly. This, according to Price, keeps the truck stop from depleting its funds near the end of each month, and incoming checks are processed faster.

In addition, Price noted, the system is used to generate various reports, including depreciation of assets, operating expenses and financial status of invoices.

Future enhancements to the system include establishing a direct telecommunications link between the motel and truck stop. Price mentioned he is thinking of also adding a word processing unit and linking gas pumps and restaurant scales to the system.



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MCLEAN, Va. — Snow, rain, heat and the gloom of night may not prevent U.S. Postal Service employees from making their appointed rounds, but they can slow things down a bit. Fortunately, there is an alternate service that not only can ignore most of nature's barbs, but reportedly can handle more than a million deliveries a month.

The service is provided by Western Union Electric Mail, Inc. (Wuemi), a full-service electronic mail organization and a wholly owned, but not regulated, subsidiary of Western Union. Wuemi employs a Sperry Univac 1100/62 multiprocessor system and a sophisticated array of supporting equipment to deliver electronic mail messages to subscribers. These messages include such high-priority items as new price notices, credit checks, schedule changes and product recalls, said Al Talamantes, vice-president and general manager. Products and services of the firm include the ubiquitous Mailgram, telegrams, cablegrams and telex messages.

Wuemi originally used a Univac 1100/22 multiprocessor system in its operation. However, the Univac 1100/62 H-2 processing system, installed this summer, tripled the organization's processing power, increased main memory from 524K- to 2.1M words, and added 2.5 times more mass storage capacity. This added capacity is necessary since a single customer file can include up to 999,000 addresses, Talamantes claimed.

Varied Customers

Subscribers to the system are as varied as its uses. Banks, utilities, auto dealers, insurance carriers and miscellaneous manufacturers and wholesalers are among frequent users, but so are legislators, airlines, hotels, labor unions and fund raisers.

Customers typically access the system by means of an electronic mail processing and communications terminal (Empact), available through Wuemi, or a customer-provided terminal. Terminal-originated correspondence reaches the organization's McLean headquarters via Wats lines or leased circuits on one of Western Union's Westar domestic communications satellites. The information enters through a Univac V77/800 communicating minicomputer where it is monitored for format and validated.

Should discrepancies be discovered, the V77 flashes appropriate error codes to the sender and receives the corrected transmission. However, if the error persists, the message is rerouted to a Wuemi "customer care" terminal and the mistake is identified and resolved, Talamantes explained.

Accepted copy passes to the 1100/62 for processing. The CPU is equipped with 11 tape and 16 disk drives that contain 30,000 client-stored texts and more than 750,000 addresses.

Depending on the client's instructions, the computer will merge a transmitted text with appropriate stored addresses and will insert as many as 36 variables into a stored text. The system will also generate a new message for a special set of instructions, Wuemi's vice-president said.

Wuemi's computer letters are printed at McLean while all other messages are transmitted via 4,800 bit/sec bisynchronous lines to the Western Union Infomaster switching complex in Middletown, Va. There, three Univac 1108s transmit them as telegrams, cablegrams and telex messages for delivery the same or next business day. Mailgram messages are routed to the closest of 141 servicing Post Offices. In all, about 50,000 messages are handled daily.

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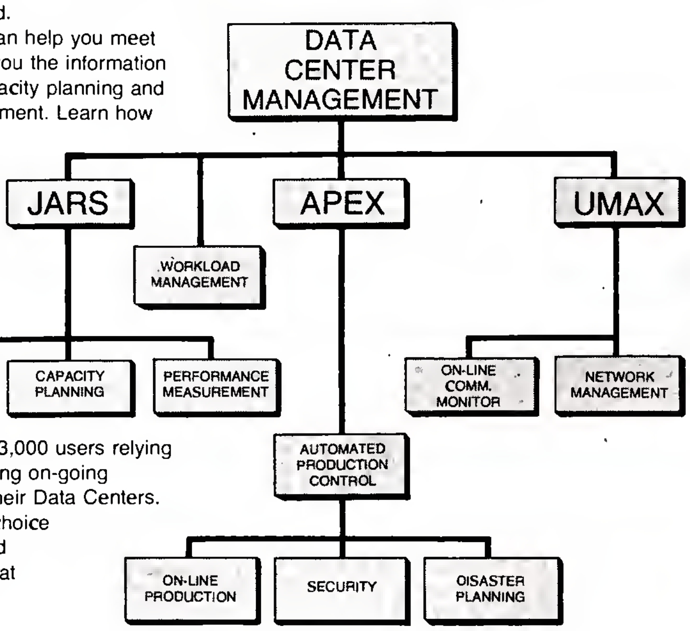

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Pulls In Retail Distributors

Auto Parts Dealer's System Accelerates Profits

PISCATAWAY, N.J. — Hoping to become a leader in the automotive parts and accessories industry, ITT Autowize, a wholly owned subsidiary of ITT Corp., has launched a program to win retail distributors.

A cornerstone of the campaign is a minicomputer in each retail outlet. Connected to a host mainframe, the minis reportedly offer the retailer assistance in more than 20 major areas from store remodeling to cooperative advertising.

Autowize is a wholesale distributor of automotive-related products with monthly sales in excess of $100,000. With 80 company-owned stores and nearly 400 associate jobbers (retail outlets), Autowize now operates in 15 states in the Northeast, South and parts of the Midwest.

With its computerized store concept, the company anticipates expansion of this base into a nationwide network of stores and distribution centers, according to company president Edgar C. Setter. "We're becoming a dominant force in most of [our] marketing areas," Setter said. "We can attribute this success largely to our model store program and the Autowize Distribution System [which features an IBM Series/1 minicomputer at each retail location]."

Each IBM Series/1 point-of-sale is linked directly to the host IBM System/38 mainframe at the dealer's regional Autowize warehouse. The system provides each store with automated invoicing, pricing, accounts receivable and inventory replenishment routines, as well as end-of-day reports and instant access to management information, a company spokesman said.

The model store project, inaugurated in 1981, marked the first phase of the Autowize marketing effort, which added 60 new jobbers and 51 conversions within the first year. The second phase, now under way, is the installation of the Auotowize Distribution System (ADS) in all participating Autowize stores.

The system is currently being implemented and tested in selected stores in each of the company's marketing regions. It is now available to all Autowize-owned stores and associate jobbers. "We expect to have 70 systems installed by the end of this year and about 200 in the next two years," according to Harold A. Clough, director of wholesale operations.

The model stores feature a retail-oriented design with heavy emphasis on innovative merchandising practices. Each store can be standardized, so that customers can find a given product in the same place in any Autowize store they enter.

Associate jobbers remain completely independent and are free to pick and choose among the various programs offered by the firm and there is no franchise, contract or fee required.

To create an invoice, the salesman keys in the sales information — quantity, part number and vendor code. ADS automatically provides the item description, looks up prices, multiplies extensions, calculates the sales tax, adds any core charges and totals the invoice. When a sale has been completed, ADS prints the invoice, according to a spokesman.

With an average investment of about $14,000 a year in ADS, company Comptroller Donald J. Ross estimates that a jobber with annual sales of $350,000 might be exected to improve cash flow by about $40,000 per year and profit by $26,000.

Although Ross stressed that the figures are only estimates, with no guarantee that they will be realized, stores in which the system is being tested tend to confirm these expectations, he said.

In the first 10 weeks of operations, one store reported that it had already reduced its investment in inventory by $18,000 and improved its margin by 1.2 points — up from 32.3 to 33.5 on a volume of $9,000 a week.

The bottom line endorsement, however, came from an Iowa store manager, who said, "If you ever take this system out of my store, it will be over my dead body."

HP Program Reduces Rates 15% for Schools

PALO ALTO, Calif. — Hewlett-Packard Co. has announced an education allowance program that allows schools and universities to purchase HP products at reduced rates.

The Education Allowance Program is directed at accredited universities and primary and secondary schools, both public and private. Customers will receive a 15% discount from list price on desktops, business computers, real-time systems and peripherals. Also, until Dec. 1, all customers that order software with a system will get the license for free, under the terms of an HP introductory offer.

Further details on the HP program are available from the company at 3000 Hanover St., Palo Alto, Calif. 94304.

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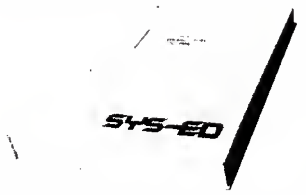

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Fast-Food Franchise Finds Mini Serves Up Information Quicker, More Efficiently

RIVERSIDE, Calif. — There comes a time in the life of a growing fast-food franchise when manual bookkeeping and accounting methods become a drag on overall productivity and efficiency and management concludes there has to be a better way.

This was the predicament faced recently by H.G. Moss, president of Moco, Inc., which operates 10 Taco Bell restaurants as part of the Moss Family Taco Bell Franchise Operations. With a forecast of continued growth in the number of restaurants under his control, Moss decided the manual methods had become increasingly slow and the process of obtaining information sluggish at best.

"We needed to get more information quicker and more efficiently," Moss said.

Initially the company investigated the possibility of using an outside service bureau to meet its accounting needs. But this would have resulted in time lags and loss of control due to transit problems. Therefore, Moss opted to install an in-house system.

A small microcomputer was installed at first, but it soon proved inadequate. Its operation was slow and memory disks had to be switched constantly.

So after scrutinizing the small business computer market, Moco settled on a Wang Laboratories, Inc. 2200 Model LVP with 32K bytes of main memory. The system also came outfitted with an 8M-byte permanent disk drive and another drive for use with interchangeable, dual-sided and dual-density 1M-byte floppy disks. The system also includes a CRT terminal workstation and a 180 to 222 char./sec printer.

The system operates under Restpak, developed by MBS Software of San Diego. Designed for Wang systems, Restpak integrates and automates accounting operations for fast-food restaurants and is capable of being tailored to individual restaurant requirements and expanded to up to 13 terminals.

"We chose the Wang computer and MBS Restpak application package based on the overall system's capability to meet our accounting needs and the ease of future system expansion," said Moss. "The application package is also highly flexible in that we can modify it to fit our specific requirements."

"Productivity has doubled because the time it now takes to perform accounting operations is reduced by half," Moss continued. "As a result, we'll be able to expand in the future without adding staff."

Report Production

As one example of productivity yields of the new system, reports are now produced on a faster and more current basis. Profit and loss statements and inventory usage reports by unit are now produced by the 10th of each month instead of the 20th as before.

"More types of management reports and analyses are also made available by system operation," Moss explained. "For example, the system provides comparison reports of this year's sales and inventory usage by unit to last year's. We also have the option of producing comparison graphs in the future.

"In addition, we can make ad hoc inquiries to the system and produce special reports based on any field in the system's data base."

The system uses a general ledger module and a number of other accounting modules, all of which are totally integrated in the general ledger module. Other modules include accounts payable, payroll, daily reports and inventory. Data entries made to each of these modules automatically access and update balances in the general ledger module on a continuing basis.

As an example of the capabilities of one module, the payroll module is used to perform all functions of the payroll and personnel process for 325 employees at the 10 restaurants operated by Moco. Breaking down the payroll operation by unit, the module permits the entry of a wide range of variable factors, maintains strict audit trails and automatically prints out all reports, including summaries for management, according to a spokesman.

Paychecks are printed as part of the module operations, and totals for quarter and year-to-date updates are posted and retained in files for the printing of quarterly reports and annual W—2 forms.

Vacation pay, bonuses, sick pay, meals, garnishments, loans and advances are also processed by the payroll module. In addition, general ledger transactions are automatically calculated and prepared for each payroll run.

All modules are run using a fourth-generation language called Automatic Information Management System, which enables module operation changes to be made in minutes.

Micro Course Aims at Execs

WASHINGTON, D.C. — A program entitled "Microcomputer Literacy Program for Executives, Managers, and Professionals" has been announced by McGraw-Hill Book Co.

The self-teaching package reportedly combines text, nine hours of audio cassettes and supplementary materials to assist the user in selecting and implementing the right microcomputer and software for business and professional applications. The program surveys the various micros on the market, evaluates their programming potential and applications and reviews compatible software, according to a McGraw-Hill spokesman.

This product is being introduced at $129.95, and additional details can be obtained from McGraw-Hill Continuing Education Center, 3939 Wisconsin Ave. N.W., Washington, D.C. 20016.

Medical Library Saves Doctors Research Hours

BETHESDA, Md. — Doctors who need quick answers to complex medical questions are using computers to eliminate hours of painstaking research.

An on-line information retrieval service at the National Library of Medicine here offers instant access to more than 1.5 million citations from medical journals around the world. At the heart of the library's Medical Literature Analysis and Retrieval System (Medlars) are two IBM 370/168 computers and 36 IBM 3350 disk storage units, each containing 634M bytes of storage.

When queried by terminals at any of the more than 1,800 member institutions in the U.S., Medline, the on-line portion of the system, can provide citations within minutes for articles dating back to 1977. In addition, the system contains off-line references to more than 3 million other citations dating back to 1965.

The system was installed in 1964 by the library to help publish the monthly *Index Medicus*. On-Line information retrieval began in 1971.

Cites Articles

According to Robert Mennert, public information officer for the library, Medline includes citations from 3,000 medical journals from the U.S. and 70 other nations. Articles are indexed by a controlled vocabulary of 14,000 medical subject headings such as lymphoma, optic nerve or even retirement. About 20,000 new references are entered each month by library staff and other indexers around the world.

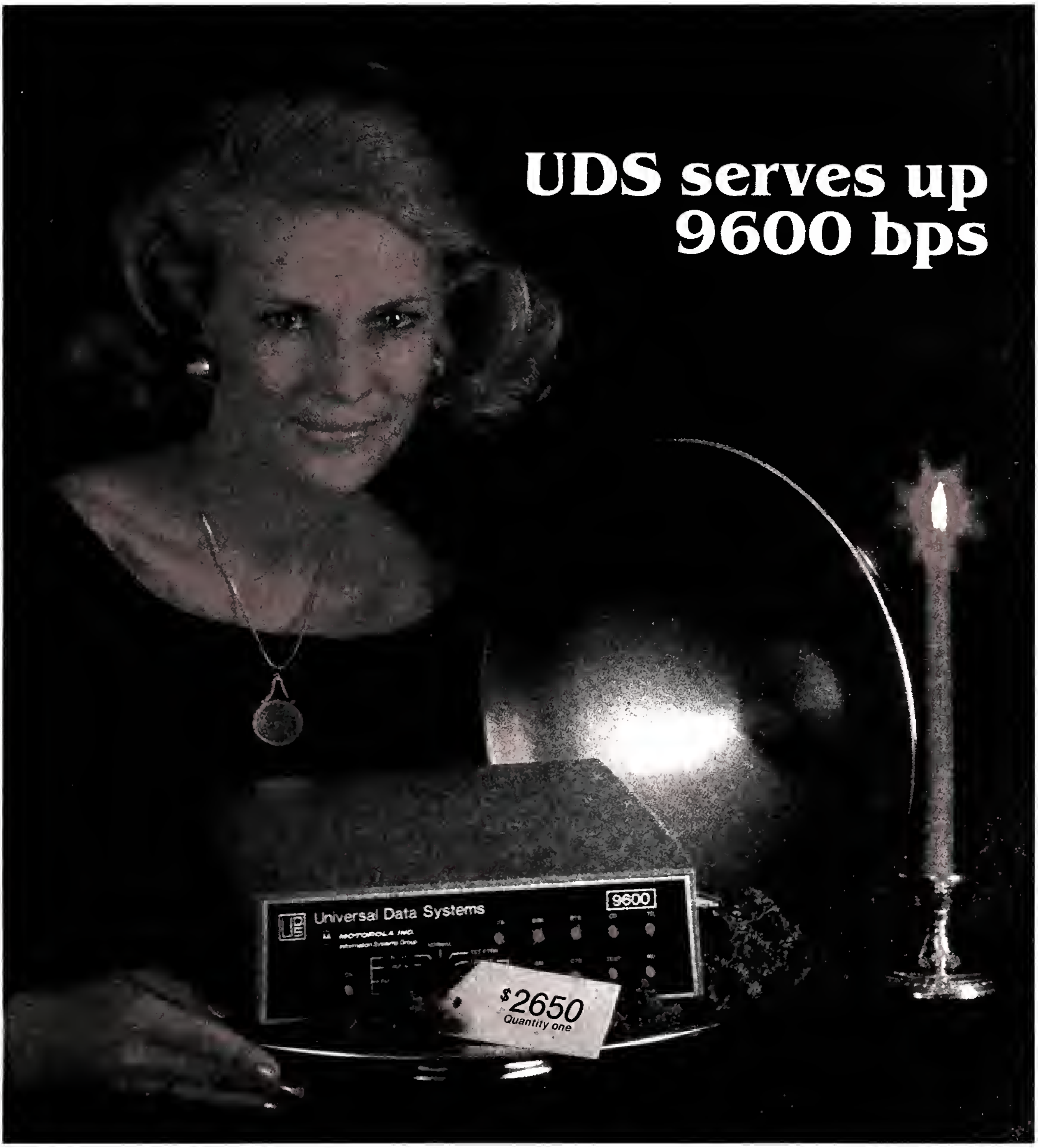
On-line users of the system can enter any combinations of subject headings and receive in minutes a list of all articles indexed under those references. Abstracts are also available for about 50% of the citations. The user can use the information to look up the articles or can request a full text from the library. High-speed laser printers produce the text overnight for mailing the next day.

The Medline software was developed by Systems Development Corp. and has been continually modified by the library's Office of Computer and Communication Systems. According to Harry Bennett, director of the office, the average computer response time to a query is one to two seconds, and the average user has a response to his initial inquiry within 10 minutes.

In addition to Medline, the Medlars information base supports more than a dozen other on-line reference files offering citations to articles in health fields such as cancer research, toxicology and bioethics.

Medical librarian Kathy Moeller at Overlook Hospital in Summit, N.J., credits Medline with helping doctors to avoid a delicate spinal operation. A 27-year-old man, his legs nearly paralyzed, presented doctors with a rare combination of problems: a mass pressing against his spine and an uncommon form of anemia called thalassemia. Moeller queried Medline for articles indexed under both the headings of "thalassemia" and "spinal-cord compression."

The system led her to an article which recommended radiotherapy rather than an operation for the rare condition. Within three weeks, the patient was able to leave the hospital, she said.



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Oct. 11-12, Dallas — **Personal Computer, Peripherals and Local Networks Forum.** Contact: Future Computing, Inc., 900 Canyon Creek Center, Richardson, Texas 75080.

Oct. 11-13, Washington, D.C. — **Analytic Performance Modeling.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

Oct. 12-13, Buffalo, N.Y. — **Data Communications – Concepts and Systems.** Contact: Association for Systems Management, Buffalo Chapter, Box 793, Ellicott Station, Buffalo, N.Y. 14205.

Oct. 12-13, Toronto — **Understanding and Using CAD/CAM.** Contact: Carol Sapchin, Account Representative, Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

Oct. 13, Detroit — **Comprehensive Electronic Office Management Seminar.** Contact: Karen Burman, Data General Corp., 6905 Telegraph Road, Birmingham, Mich. 48010.

Oct. 13-14, Paris — **The General Public Video Market.** Contact: Midem Organisation, Societe Anonyme au Capital de 1.000.000 de Frances, Registre du Commerce, Paris B 662 003557.

Oct. 13-15, Chicago — **Minicomputer Systems: Guidelines for Successful Selection, Acquistion & Operation.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 13-15, Washington, D.C. — **Data Communications: An Introduction to Concepts and Systems.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

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Oct. 13-15, San Francisco — **Project Management Workshop.** Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

Oct. 13-15, New York — **Fundamentals of Data Processing for the Non-Data-Processing Executive.** Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

Oct. 13-15, New York — **Data Communications Network Components.** Contact: System Technology Forum, Inc., 9000 Fern Park Drive, Burke, Va. 22015.

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Oct. 13-15, Cincinnati — **Forecasting Techniques for Decision Making.** Contact: Registrar, Control Data Management Institute, 6003 Executive Blvd., Rockville, Md. 20852.

Oct. 13-15, Washington, D.C. — **Satellite Data Networks – Phase II.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

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Oct. 13-15, Atlantic City, N.J. — **The Third Annual Hewlett-Packard Co. Users Eastern America Conference.** Contact: Northeast Central HP Regional Users Group, Inc., Frank Whalon, Tinius Olsen Testing Machine Co., P.O. Box 429, Willow Grove, Pa. 19090.

Oct. 14-15, Dallas — **An Executive Briefing: "Computers – Can You Afford Not to Understand?"** Contact: Arthur Andersen and Co., 69 W. Washington St., Chicago, Ill. 60602.

Oct. 14-15, Washington, D.C.— **Managing Software Projects II.** Contact: Data Processing Management Association, Education Foundation, P.O. Box 91295, 5959 W. Century Blvd., Los Angeles, Calif. 90009.

Oct. 14-15, St. Louis — **Small Business Systems: Design, Acquisition and Application.** Contact: Roy Twilley, Director, Noncredit Programs, School of Continuing Education, Western Illinois University, Macomb, Ill. 61455.

Oct. 14-15, Williamsburg, Va. — **Communications Developments & Trends.** Contact: System Technology Forum, Inc., 9000 Fern Park Drive, Burke, Va. 22015.

Oct. 14-15, Boston — **Local-Area Networks: Selection Guidelines.** Contact: Seminar Department, Datapro Research Corp., Delran, N.J. 08075.

Oct. 14-15, London — **World Telecommunications.** Contact: Financial Times Conference Organization, Minster House, Arthur St., London, EC4R 9AX, England.

Oct. 14-15, New York — **SAS Processing Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

Oct. 14-15, Toronto — **Understanding and Using Computer Business Graphics.** Contact: Carol Sapchin, Account Representative, Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

Oct. 15, Waltham, Mass. — **New England Computer Law Forum.** Contact: Peter A. Marx, Chase Econometics/Interactive Data Corp., 486 Totten Pond Road, Waltham Mass. 02154.

Oct. 15-16, Paris — **The Stakes of the Telematics Universe: Videotex Data Banks.** Contact: Midem Organisation, Societe Anonyme au Capital de 1.000.000 de Frances, Registre du Commerce, Paris, France, B 662 003557.

Oct. 17-20, Boston — **1982 International Telecommunications Forum.** Contact: Janet Maurer, Arthur D. Little Decision Resources, Acorn Park, Cambridge, Mass. 02140.

Oct. 17-20, Chicago — **Data Processing Management Association Conference (DPMA '82).** Contact: DPMA, International Headquarters, 505 Busse Highway, Park Ridge, Ill. 60068.

Oct. 17-21, Columbus, Ohio — **American Society for Information Science Conference (Asis '82).** Contact: Asis, 1010 16th St. N.W., Washington, D.C. 20036.

Oct. 18-19, New York — **CICS/VS Application Design.** Contact: Teltech, 548 Fifth Ave., New York, N.Y. 10036.

Oct. 18-19, New York — **Networking, Protocols and Standards.** Contact: Seminar Dept., Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 18-19, New York — **Data Administration: Successful Techniques.** Contact: Seminar Dept., Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 18-20, Port Chester, N.Y. — **Communications Managers Association 1982 Sixth Annual Conference & Exhibition.** Contact: Communications Managers Association Office, 2 N. Finley Ave., Basking Ridge, N.J. 07920.

Oct. 18-20, Summit, N.J. — **Job Control Language.** Contact: Chubb Advanced Training Center, 480 Morris Ave., Summit, N.J. 07901.

Oct. 18-20, Minneapolis — **Managerial Success.** Registrar, Control Data Management Institute, 6003 Executive Blvd., Rockville, Md. 20852.

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Oct. 21-22 in Chicago

Method/1 Users Group to Meet

CHICAGO — The newly formed Method/1 Users Group will hold its charter meeting at a conference to be held at the Ambassador Hotel here Oct. 21-22. The conference was organized to exchange user information and facilitate feedback about Method/1, a structured project management and systems design methodology, to its vendor, Arthur Andersen & Co.

Conferees will ratify bylaws proposed by officers Vince Heiker, information systems manager for Boise Cascade Corp., Composite Can Division, who serves as group president; Larry Elias, group systems manager at American Motors Corp., serving as vice-president; Richard Sanders, group manager of marketing systems at Baxter Travenol Laboratories, Inc., who serves as vice-president for publicity and programs; Pat Rocco, manager of standards and quality assurance at ARA Services, Inc., group secretary; and Jack Blaesing, corporate systems and programming manager at Brunswick Corp., group treasurer.

The officers will also establish standing committees to address user needs.

Conference registration is $195 per attendee and $95 for each organization's additional attendee. Further information is available from Method/1 Users Group, Suite 800, 33 W. Munroe St., Chicago, Ill. 69630.

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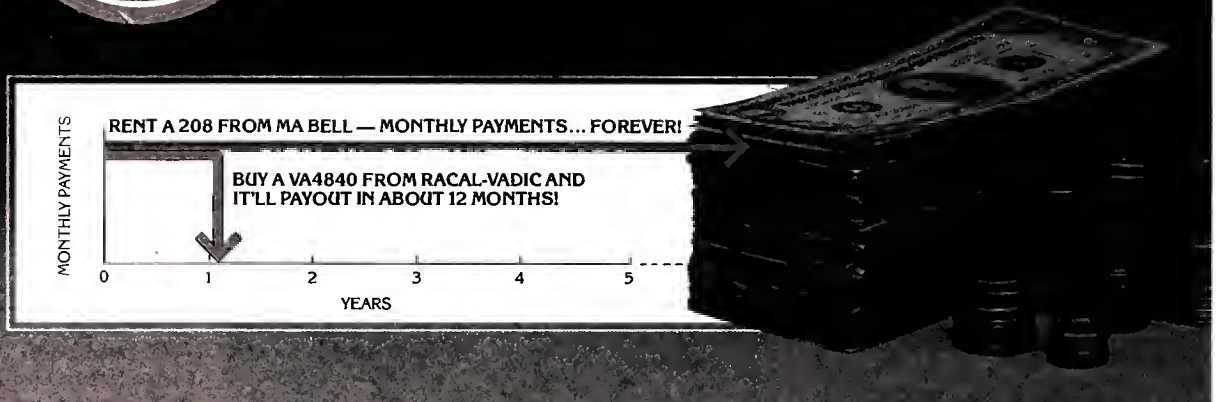

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A user who buys Racal-Vadic's new VA4840 modem, instead of renting a 208 from you, saves thousands of dollars in just a few short years. You see, Ma, the Racal-Vadic VA4840 has a payout of around 12 months and the monthly outlay is the same as renting. But renting from you is "forever."

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In addition to costing far less than your 208, the VA4840 is smaller and has many more features and options. Look at its size, Ma. Eight VA4840 PC boards fit in Racal-Vadic's 10.5-inch-high rack-mount chassis. Up to 48 fit in a 7-foot rack cabinet, saving valuable space in central-computer sites. For remote-terminal use, the VA4840 comes in a single channel, desk-top cabinet.

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The VA4840 was designed for point-to-point or multipoint networks in which superior performance over normal unconditioned telephone lines is a must. The VA4840 uses an advanced automatic adaptive equalization system which enables the modem's receiver to instantly change filtering to compensate for variations in phase delay, amplitude roll-off, frequency offset, and carrier phase jitter. Our new 4800 bps modem features a built-in general purpose 8-bit microprocessor which controls a 16-bit multiplier and memory to perform all of the signal processing functions. This type of architecture greatly reduces the overhead and cost of the modem's design.

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The VA4840, like most Racal-Vadic modems, is FCC approved for direct connection to the switched network using programmable data jacks or a standard telephone jack. The VA4840 offers extensive diagnostics including Automatic Idle Test, Analog Loopback, Local and Remote Digital Loopback, and Self-Test.

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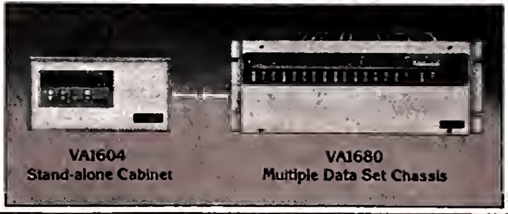

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ASI Course Targets MVS Users

ARLINGTON HEIGHTS, Ill. — Advanced Systems, Inc. (ASI) has announced a multimedia training course that reportedly addresses IBM's MVS/SP/XA.

The course consists of seven sections: overviews of MVS software, hardware and architectural developments; improvements in efficiency, reliability and serviceability; new features; and conversion considerations.

The price for the series is $50/tape or more, depending upon the customer's lease contract.

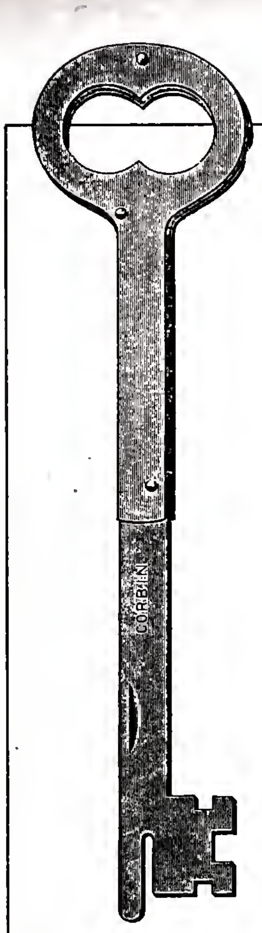
The course is listed under "Course No. 3970, Technology Perspective: MVS/SP/XA and Series H" and can be ordered from Pat Sorrentino at ASI, 2340 S. Arlington Heights Road, Arlington Heights, Ill. 60005.

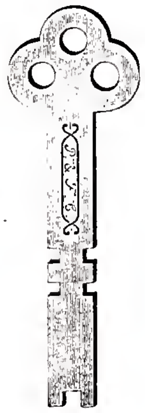
Course Covers Pascal Concepts

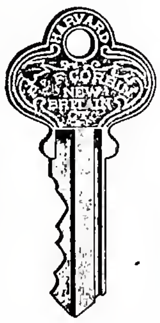
FORT COLLINS, Colo. — Colorado State University has announced a three-part color videotape short course that covers the concepts of programming using Pascal.

Part 1, a series of 10 tapes, costs $950 for a four-week lease (purchase price $3,700) with study guide priced at $25.25; Part 2, eight tapes, costs $765 for a four-week lease (purchase price $2,960), study guide $21.95; and Part 3, six tapes, costs $570 for a four-week lease (purchase price $2,220), study guide, $17.50.

Further information is available from W.L. Somervell Jr., Director, Engineering Renewal and Growth Program, Colorado State University, Christman Field, Building 1000, Fort Collins, Colo. 80523.







Who Owns Innovation?

By Robert A. Spanner

Part 2 of a two-part series on the rights and obligations of high-tech professionals

THIS IS AN ARTICLE ABOUT the commercial exploitation of information in high-technology industries and the rights of those who possess that information to use it for their own purposes. Part 1 of this two-part series defined trade secret: a process, device or other embodiment of information developed by a company and used in its business that gives the company a competitive advantage and that the company seeks to keep confidential.

Last week we explored the confidentiality agreement: what to look for and negotiate when confronting a new employer. We also introduced a hypothetical protagonist, Roger Smith, a mechanical engineer with an advanced degree in computer science. He has six years of work experience in computer-aided design and has just received his first management position — research director for a new computer-aided

This article is excerpted from the author's forthcoming book Who Owns Information?, *to be published in 1983 by Dow Jones-Irwin, 1818 Ridge Road, Homewood, Ill. 60430.*

design and manufacturing (CAD/CAM) system for the machine tool industry.

We saw the conflict that arose between business interests and protection of legal rights when Smith, in his new position, attempted to promote trust and improve employee relations — while unwittingly compromising his company's right to trade secret protection. We explored Smith's rights and obligations when another company recruited him for employment. This week we continue with another scenario: What if Smith leaves the company to found a new venture?

Start-Up Scenario

In the '80s, a growing number of employees in the computer industry service sector will leave their jobs to found start-ups. Capital requirements are low, automation will lead to large productivity increases and competition for capable individuals will be intense. Skilled employees will gain the bargaining power to work on a contract basis and remain independent.

Some of the issues discussed below might also arise when a key employee moves from one high-technology firm to another. However, they are of greater significance in the context of a new, independent enterprise, and so they are dealt with here for convenience.

Once an employee decides that he will enter into competition with his employer, he is already in a potential conflict-of-interest situation and must carefully monitor his activities and those of any fellow employees who will join him in the venture. The employee planning a new competitive venture will inevitably feel uncertain and apprehensive about such a bold undertaking and at times will be strongly tempted to act on the job to the benefit of his future enterprise and the detriment of his present employer. But the temptation must be resisted, for nothing is more certain to provoke the wrath of a court than evidence that the employee was actively undermining his employer's business while that employer was paying him a handsome salary.

Unless an employee is independently wealthy or has access to venture capital, his plans for a new company will require time and careful nurturing before they can be brought to fruition. Frequently, the employee will need to stay in his present job for quite some time while he makes the necessary preparations and generates enough income to see him through the lean times ahead. In such circumstances, a legal requirement that he disclose to his employer his plans to compete would effectively foreclose those plans from ever reaching fruition, while at the same time causing the employee to lose his job.

There is considerable disagreement from jurisdiction to jurisdiction as to how much disclosure of one's future plans to compete the law requires. Some jurisdictions recognize that disclosure of such plans can be disastrous and do not require it, while others equivocate and say that the intention to compete must be disclosed, but not the details of the plans. In this latter line of cases, it is clear that the courts were concerned that the employee not take advantage of his concealed intentions to the detriment of the employer.

Although it is always hazardous to predict what judges will do, in general so long as an employee steers well clear of unfairly taking advantage of the circumstances, his failure to disclose to his employer his future intention to compete will not run afoul of the law. It is also safe to say that the more an employee discloses to his employer, the more aggressive he can be in pursuing his plans, so long as he does not affirmatively act to the detriment of his employer.

What to Avoid

Let us consider a few situations. Obviously, Smith could not go out and start lining up customers for his new venture while still in his present job. Such business is referred to as the "corporate opportunities" of Smith's employer, and he could not divert that business from his employer to himself without breaching his duty of fidelity to his employer.

Although some forms of communi-

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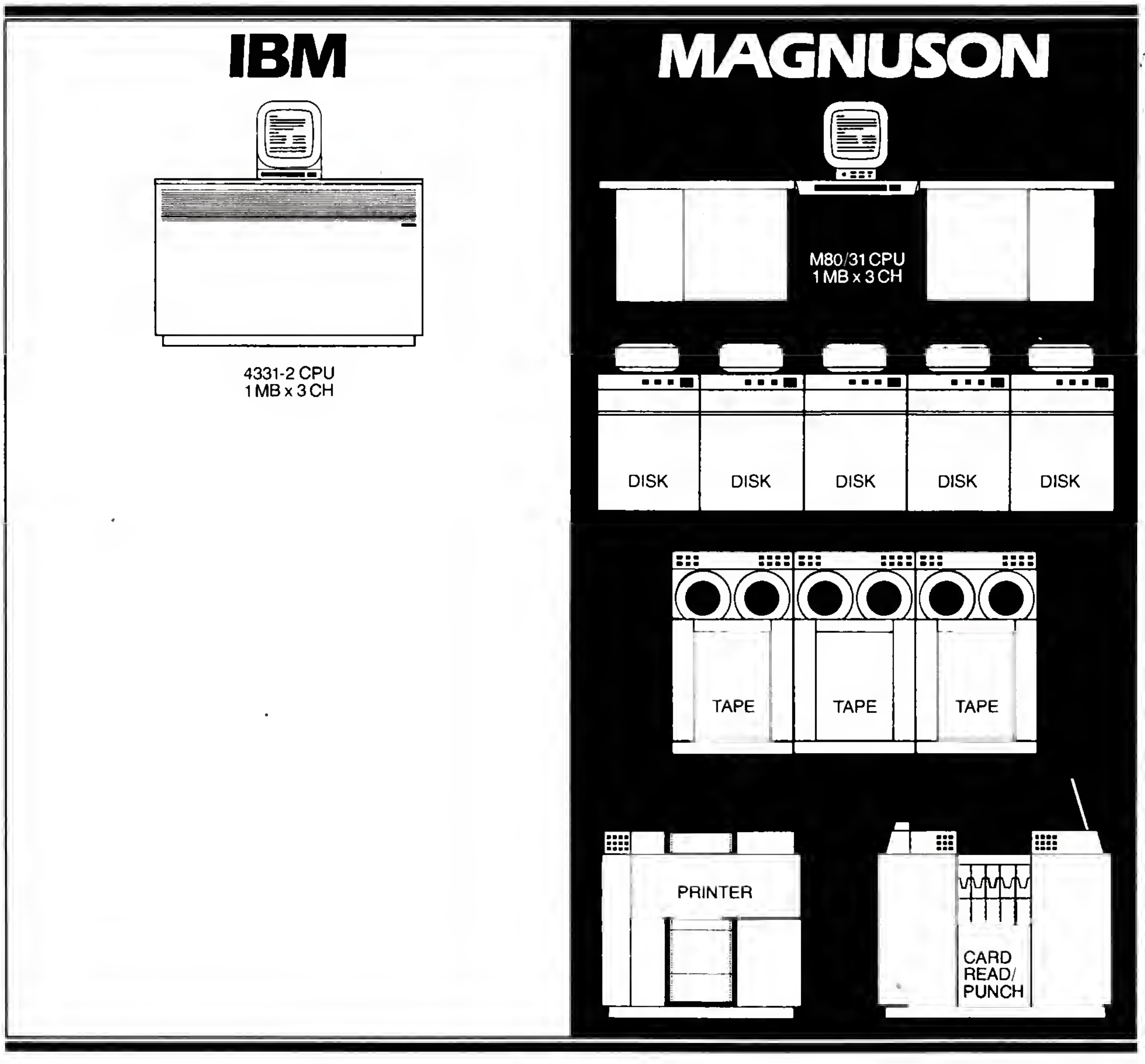

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cation with customers and clients concerning an employee's plans are permissible, if the employee intends to keep his plans secret from his employer, he would be wise to steer clear of *any* customer contact regarding the plans, even though in any given situation his communications with a customer about his intentions might be innocuous. To do otherwise would be to run the risk of a claim that by concealing his plans, he prevented the employer from taking defensive steps to prevent a loss of business to the employee's prospective enterprise.

In nondisclosure situations, the employee who broaches the subject of his future competition with his employer's clients and customers is flirting with a lawsuit.

The employee starting a new venture must take care to prevent permissible customer communications from unintentionally turning into impermissible customer solicitations, even where his plans have been disclosed. The employee can inform clients or customers of his intention to go into business for himself, and in some jurisdictions he can even inquire about the customer's potential interest in the goods or services of his prospective venture. But he must avoid going beyond this point and asking what types of products or services the customer would be interested in purchasing or what his anticipated volume of purchases might be.

Any salesman will recognize these questions as subtle forms of solicitation, and as was discussed above, diversion of business from the employer to the employee's new venture is a breach of the employee's fiduciary obligation.

Even if the employee did not even intend to seek a commitment from the customer, the more detailed his discussions are, the more likely it is that the customer will believe that a commitment was the employee's objective. It must be kept in mind that these kinds of cases almost always turn on circumstantial evidence, and if a customer believed he was being solicited, it would be extremely difficult for the employee to prove that that was not his intention.

Therefore, not only should the employee not say anything that could be construed as solicitation, but he should tell the customer that he is *not* seeking a commitment of business and does not want the customer to make such a commitment. This may seem like bad business, but if an injunction is entered against the new venture, it will be deprived of this business anyway; or if damages are awarded against the employee for improperly soliciting business, the new venture will incur a loss for the employee's troubles.

Other 'Don'ts'

There are a number of other practices that an employee planning to compete with his employer should avoid. He should not use any of his employer's resources to further his planned venture. To do so would be to use the employer's resources to help establish a competitive enterprise to the employer's detriment. An employee should not use his employer's computer or the services of the law department or bookkeeping department, nor should he direct company employees to conduct research of tangential relevance to the company but of direct application to his proposed new business.

Similarly, he should refrain from ordering market reports, newsletters, books or the like that he needs but his employer doesn't, and he should not borrow test equipment or materials to help his own research efforts. Each of these acts may seem relatively innocent in isolation, but their cumulative effect can be to tip the scales against the employee in a close case. With so much at stake, it is folly to take such chances.

Most important of all, the departing employee must continue to devote his entire attention during the working day to the business of his employer. In addition to a duty not to act contrary to the employer's interest during the tenure of his employment, the employee also has a duty to exert his best efforts on behalf of his employer. This may result in a certain amount of conflict, for the employee will not be inclined to commit himself fully in an unsatisfying employment relationship. However, in order to avoid a later charge by his

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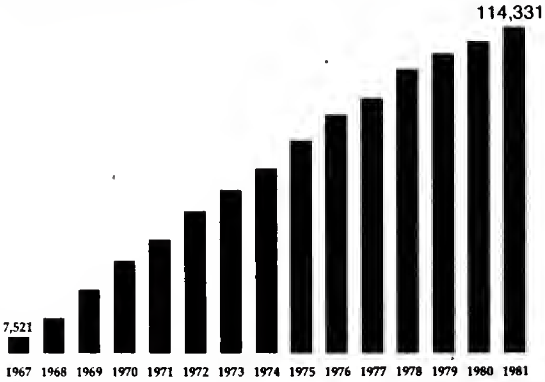

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employer that he was taking the employer's money and spending his time on preparations for a competing enterprise, the employee needs to discipline himself to give his employer dedicated service while he is on the payroll.

With such a long list of "don'ts," it may begin to seem as if the principle that an employee may prepare to compete while he is still employed is an empty promise; but such is not the case. On his own time and with his own resources, the employee may do everything necessary to make his proposed venture succeed. He may incorporate the company, seek venture financing, negotiate bank loans and prepare the business plan. He may conduct interviews and hire personnel (with the caveats noted in Part 1 of this series), order materials and equipment and enter into leases or buy real property. *In short, he can do everything necessary to be able to begin operations the moment he leaves his former employment.*

One final subject concerning the pretermination period deserves comment here. No matter how much acrimony might attend the loss of a valuable and (formerly) trusted employee and no matter how much the company just wants to throw him off the premises, *management should conduct a debriefing directed to the proprietary nature of the company's confidential information.*

At this stage, the company best knows what the employee has learned in its employ, and the company should identify to the employee those items of information it expects him to respect as proprietary. The company should also ask the employee to acknowledge in writing the confidentiality of the information to which he has become privy. Such a practice forecloses an employee from claiming he was never told what information was proprietary; it also buttresses the contention that adequate security measures were taken to protect proprietary information.

When a key employee is departing to work for a competitor, his discussions with his former employer are likely to be delicate, and he should consult with counsel before embarking on them and, certainly, before signing anything. In addition, the new employer should participate, at least behind the scenes, from the inception of these discussions. Otherwise, the employee may stipulate to the confidentiality of information his new employer has independently developed, and the employee's admission may prove to be an acute embarrassment in the event of subsequent legal proceedings.

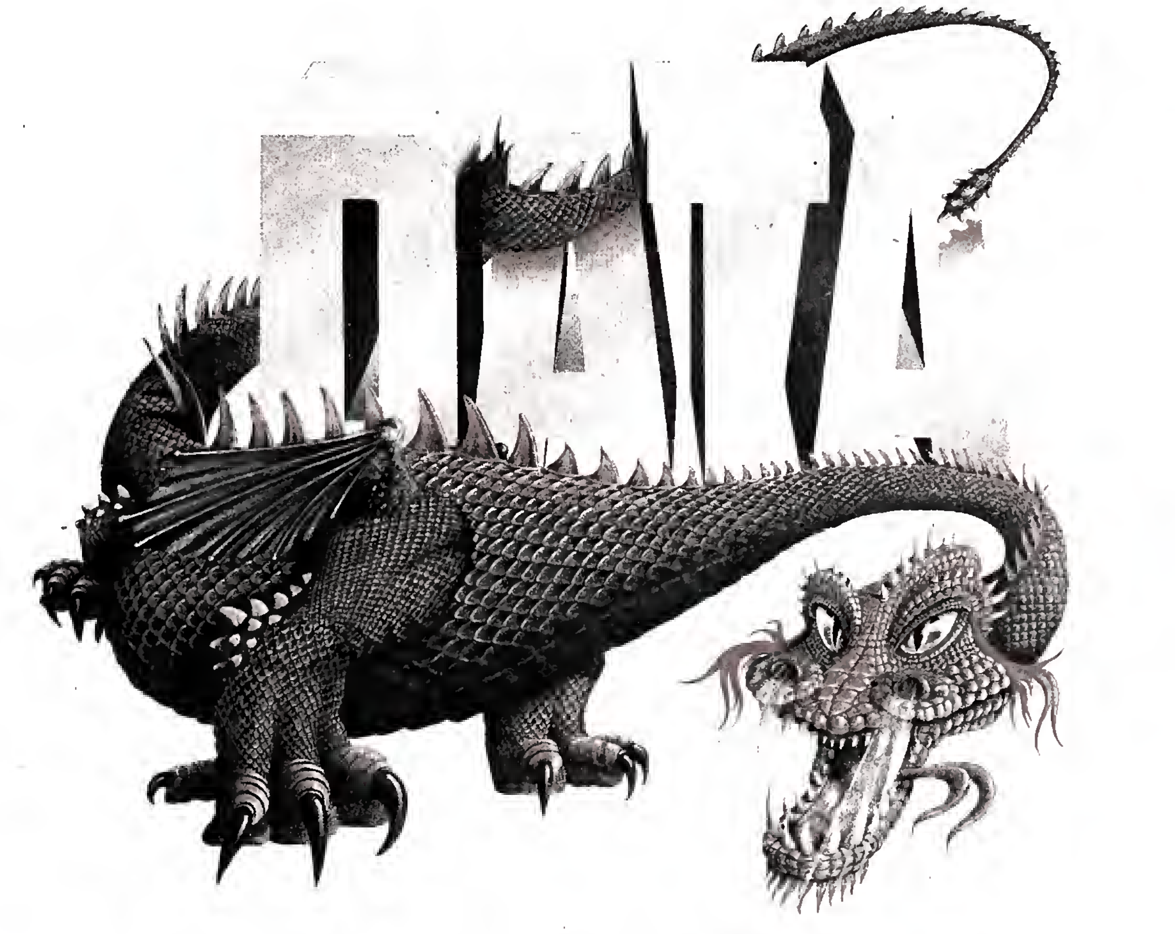
After Termination

Let us now turn to the period following termination. How a departed employee conducts himself in the employ of his new company will obviously have a profound effect upon the outcome of a trade secret dispute.

> *'No matter how much acrimony might attend the loss of a valuable and (formerly) trusted employee and no matter how much the company just wants to throw him off the premises, management should conduct a debriefing directed to the proprietary nature of the company's confidential information.'*

When Smith leaves, let us assume that like most scrupulous employees, he does not remove any project notebooks. However, he probably *would* take his personal notebooks, because like most employees, he would regard them as his own property. Let us assume that these notebooks contain Smith's own assessment of the market potential for the company's planned CAM equipment, the identity of potential customers, notes of conversations with potential customers and rough estimates of market demand and associated costs.

In a lawsuit, the company would undoubtedly demand the return of these notebooks and an injunction against their use, claiming that the information contained therein was confidential. But courts have gener-



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ally rejected trade secret claims as to marketing information. Information about market demand, supply sources and advertising techniques are not usually regarded as trade secret subject matter. Rather, this kind of information is considered to be a component of an employee's general knowledge and not to be "secret" at all, but rather to be accessible to others in the industry.

The same is true of the identity of customers. Unlike the so-called "customer list" cases, where the identity of people interested in a particular good or service out of a large population of potential users is deemed to be commercially valuable and legally protectable, the identity of both sources of supply and of customers or potential customers is not usually protected.

There are good reasons for this. First, the identity of suppliers and customers is usually determinable from publicly available sources such as telephone or trade directories. Second, unlike the service-oriented customer-list cases, where isolating the identity of consumers interested in the service is the major battle, the success of commercial goods and services is predicated not upon knowing who the potential buyers are, but upon the features of the good or the proficiency of the service itself.

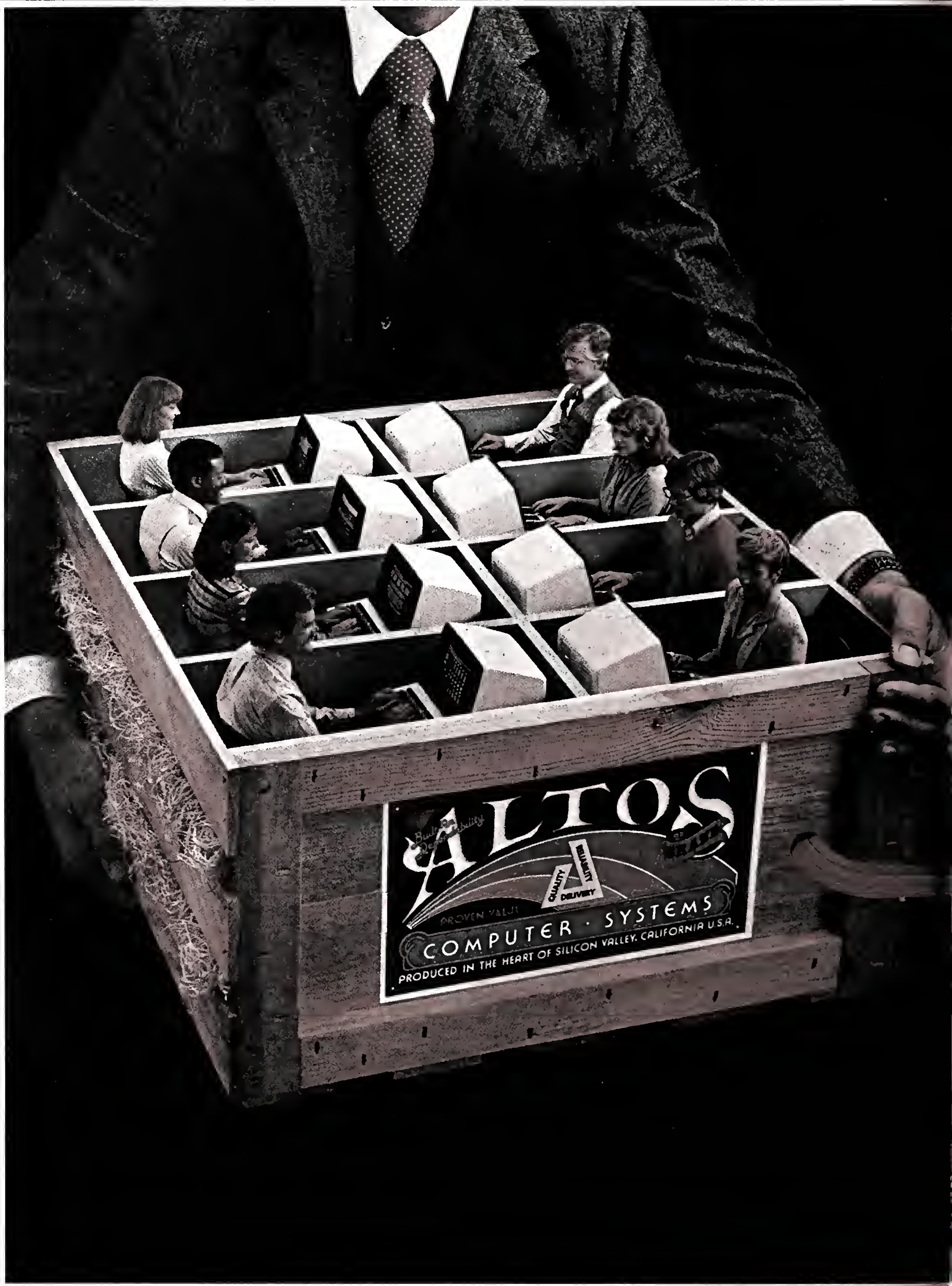
Employee Notes

Some practitioners suggest that employee notes can be turned into trade secrets by identifying them as such through the use of a confidentiality stamp or by other means. Although such practices would be of evidentiary value where the material actually contained arguably confidential information, they will not transform material into legally protected confidential information if it was not of such a nature otherwise.

In order to show such confidentiality, it would be necessary to show that the gathering of the information required substantial time and expense and was demonstrably not available to others. Seldom will an employee's marketing notes be of this nature.

However, the issue of employee notes does introduce a general strategic problem. While business and marketing information of the kind we have assumed to be in Smith's notebooks is readily comprehensible to the layman, scientific and technical notes are not. Even a patently fallacious assertion of trade secret protection could not be perceived as such by a judge or jury, and the resolution of this question would then deteriorate to the level of conflicting expert testimony that neither judge nor jury might fully understand.

It is therefore advisable for departing employees not to take with them technical and scientific notebooks they have developed during their tenure without the express permission of their employer. In fact, many confidentiality agreements require that all written material be returned to the company upon termination of employment, and an employee's failure to do so, whether negligent or willful, would be regarded



by a judge or jury with suspicion — particularly if the material retained *looks* esoteric.

If it is inadvisable to depart with written material that does not constitute confidential information, it is incalculably more unwise to remove material that *is* confidential. Misappropriation of trade secrets can doom an entire enterprise to failure, even if the misappropriation represents only a small contribution to the venture as a whole.

If detected, such conduct is likely to be dealt with severely by a court and could result in the entry of a ruinous injunction. Moreover, in some states, theft of trade secrets is a criminal offense, and prosecutors are overcoming their initial reluctance to charge these offenses. In short, the legal exposure is great and the potential consequences catastrophic.

Employee Knowledge

Let us now address the most perplexing problem in trade secret litigation — differentiating what is proprietary information from what is not. We began by assuming that Smith was a trained computer scientist who already had substantial CAD experience before he was hired to develop a CAD/CAM system for the machine tool industry. When he began work, the company would undoubtedly have supplied him with a substantial amount of technical material related to the project he was to manage, such as scientific papers, an in-house review of the state of the art and research generated by company employees.

During the course of his employment, Smith would himself have contributed to technological advances and become privy to research generated by the company's employees. If Smith were subsequently to participate in the development of competing systems, one must almost answer the question how one knows what one knows before being able to attribute what part of the new system resulted from Smith's own knowledge and what part was attributable to the use of confidential information generated by the company. And that inquiry is made even more complex by the interrelationship between Smith's own knowledge and the creation of the proprietary information itself.

Resolving what information is proprietary to the employer and what information can be used by the employee is also complicated by competing social and economic policies. In our society, it is the responsibility of each person to provide for himself and his family. Restraints on an employee's ability to use what he has learned in a previous job will obviously have an adverse impact on the employee's ability to make a living and thus conflict with a fundamental tenet of our social system. But equally basic in our society is the moral precept that it is unfair to misappropriate the fruits of another's work.

This same conflict is played out in the economic sphere between the competing policies of putting the knowledge and skills of employees

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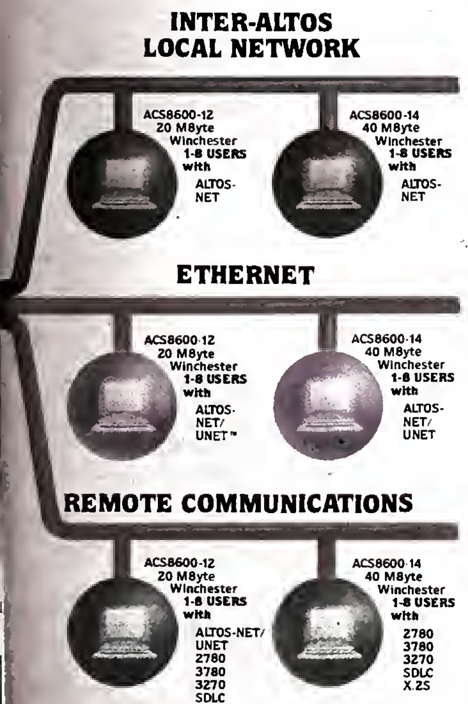
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to their most productive use on the one hand and, on the other, assuring to companies investing in research and development a fair return on their investment.

These contending forces have given rise to the uneasy legal compromise that employees may utilize only their own general knowledge, education, expertise and experience in subsequent employment without restraint. But this principle is merely a restatement of the issue: The difficult task is differentiating an employee's general knowledge from proprietary information belonging to his employer.

What is confidential and secret and what is the employee's own is easily identifiable only at the extremes. Clearly, an employer has no right to prevent its employees from subsequently using any knowledge, information and experience they have acquired during the course of their formal education or during their previous employment. By the same token, a company clearly can prevent an employee from using or disclosing in subsequent employment a trade secret the company developed prior to the employee's arrival and then taught to him in confidence. Unfortunately, the circumstances presented in disputes involving technological information often fall between these two poles.

Although trade secret cases are fact-intensive and therefore not susceptible to sharply crystallized rules, a few generalizations can be made regarding the vast middle area in which the facts of so many trade secret cases seem to fall. Where an employee was already highly trained in a given area and made no advance in the state of the art during his tenure, he will be permitted to use the knowledge and experience he gained during his employment, even if it results in the duplication of tasks he accomplished for his former employer.

To apply this principle to our own hypothetical situation, Smith could work on the development of CAD systems for a subsequent employer — even CAD systems to be interfaced later with CAM systems — without breaching his nondisclosure agreement or his implied-in-law duty of loyalty to his former employer. He would simply be utilizing the knowledge and experience he had developed long before. And to the extent that he structured the CAD output to make it more amenable to a CAM system, this would simply be the product

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of his own job experience with CAM systems and not the result of using his former employer's proprietary information.

Balancing Test

But what of the situation where an employee substantially enhances his own knowledge and skills while advancing the state of the art in his previous employment?

One approach to this problem is a balancing test, whereby an analysis is made of the relative contributions of employer and employee to the research and development of the product or service. Under such a test, where the development was primarily achieved through the knowledge and expertise of the employee, the employee's time on the project was a substantial portion of the total and the success of the project was attributable to the initiative and persistence of the employee, the employee is permitted to use later the information obtained during the development project.

On the other hand, where development of a product is primarily attributable to the resources the company devoted to it, including time, capital and managerial supervision, information discovered during the project may not be used by the company's employees in the service of another company.

Such a balancing of the respective contributions of employer and employee implicitly embodies traditional factors relied upon by courts in deciding trade secret cases, such as the extent to which an employee will be rendered unemployable if he cannot use the information, society's interest in employee mobility and equitable concerns that the employer not be deprived of the benefit of its investment in research and development.

For example, if an employee's contribution to the development of a secret process represented a small part of the whole, it cannot be said that he is rendered unemployable by being prevented from disclosing the process, because there would be no outside market for his specialized contribution to the secret process. And to permit such an employee to disclose the secret process would not only deprive his employer of the benefit of its investment, but would also give the employee an unearned windfall.

On the other hand, where an employee himself is primarily responsible for a new process, the investments of employer and employee are made nearly equal in extent (though different in nature). Furthermore, restraint upon use or disclosure of the process would significantly affect the job opportunities of the employee, because the employee's knowledge and experience would be significantly coextensive with the information embodied in the developed process, so that a restraint on use of the latter would in large part be restraint on use of the former.

Another approach has been to prevent an employee from subsequently using even information he was primarily responsible for developing if he signed a nondisclosure agreement covering all information developed by him during the course of his employment. Such an approach has the merit of simplicity, but it would result in significant restraints on employee mobility on account of the prevalent use of confidentiality agreements today, and it utterly disregards the policy considerations that courts have developed to deal with trade secret disputes between employer and employee. Anyone with significant experience before judges has to wonder whether courts will so readily abandon their judicial prerogatives to the clever draftsman.

Employer-Owned Information

The preceding discussion concerning the respective rights of employer and employee in information the employee participated in developing concerns an issue at the cutting edge of the law. The rules regulating subsequent use of information developed by the employer and conveyed to the employee are more settled.

Suppose in his subsequent employment Smith were to incorporate a circuit developed by his former employer which Smith believes to be clumsy, but which is convenient to use. Contrary to popular concep-

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tions, information need not be of exceptional importance to be protectable as a trade secret. So long as the circuit design was proprietary, useful and confidential, Smith's use of the circuit would be in violation of his fiduciary obligations to his former employer.

On the other hand, Smith's use of a highly valuable circuit developed by his former employer would *not* subject Smith to legal liability if it was readily derivable from nonproprietary sources. Thus, if Smith could identify a closely related circuit design in the public domain and could show how the circuit he used was readily derivable from it, there would be no trade secret liability, because there would be nothing whose subject matter could be considered "secret."

Another Twist

But now let's take another twist of the legal puzzle and show how perverse the law can appear. Suppose that Smith were to do the previous principle one better. Rather than independently developing a system for his new employer, suppose Smith were simply to conduct an elaborate search of publicly available information, such as textbooks, professional papers, dissertations and the like, for the purpose of showing that each and every step in the system developed by his former employer had either been publicly disclosed or was easily derivable from information that was in the public domain.

The rationale would be that if a component of a system has been disclosed in public sources and is therefore not a trade secret, then surely stringing a whole series of such publicly derivable elements together into a working system could not result in the system as a whole being protectable as a trade secret.

This reasoning has a certain symmetry to it, and it is one of the favored arguments of defendants sued for unauthorized use of trade secrets, but it is not the law. A combination of known features or components of a program or process can be a trade secret if the particular combination is unique or is being used for a unique application. In order to overcome a claim of secrecy, it must be shown that the product or process claimed to be secret is itself in the public domain. Artificially dissecting it into publicly known components will not defeat trade secret protection.

If Process Dictates

Finally, let us look at one other nuance of trade secret protection. Suppose that Smith has used certain steps from the system developed for his former employer because the use of those steps was dictated by the very process being automated.

A simple-minded example might be a program that directed the insertion of a screw into a hole, the placement of a washer and the tightening of a nut from the other side. Most independently developed programs for performing this task will be functionally similar, because each component of the program is dictated by the task itself.

The law does not require elaborate gymnastics to perform a particular function in a different way simply for the purpose of being different. If the function to be performed dictates the process by which it must be performed, no trade secret protection is afforded, because once again there is no secret subject matter.

Trade Secret Defenses

Thus, we see that unauthorized use of marginally useful information may violate the law while unauthorized use of invaluable information does not. And under some circumstances, a process whose steps are all publicly known may nevertheless be a trade secret, while another process whose steps have not been explicitly disclosed will not be a trade secret. These apparent paradoxes derive from the central fact that the point of departure for all trade secret issues is secrecy in fact. Absent truly confidential information, there can be no liability for misappropriation of trade secrets, no matter how egregious the conduct.

When confronted with a charge of misappropriation of trade secrets, former employees often try to show development by "reverse engineering." There seems to be a general ap-

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COMPUTERWORLD
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CIRCULATION DEPT. 375 Cochituate Road, Rte. 30, Box 897, Framingham, MA 01701-9985 preciation for the fact that one can take something apart and figure out how it works and then duplicate the product without legal liability. The legal counterpart of this intuitive fact is the familiar principle that if information is derivable from what is disclosed, there is no secrecy and hence there is no legal protection.

But in order to succeed, the defense of reverse engineering must be plausible. The circumstances we have been discussing — the departure of a researcher or inventor to perform the same line of work for a competitor — does not lend itself to such a defense. When a competing product, process or service that duplicates that of the prior employer suddenly emerges from the employee's new company, it strains credulity to contend that the employee methodically and painstakingly set out to discover what he already knew or that he could put out of his mind what he knew even if he tried to reverse-engineer in good faith.

And if it is not conceded that the employee participated in developing the competitive product, it certainly will be difficult to explain the timing of the product's emergence — particularly if development time and expense were a small fraction of what was originally required.

As a general proposition, a better defense in employer-employee trade secret disputes is want of actual secrecy. In almost every case, evidence of slovenly security practices is available. But if the decision is made to deny that certain information in a new employee's possession constitutes a trade secret, that decision must be consistently adhered to by all departments of the company.

If, for example, management has rejected a claim of secrecy as to a certain process by one of its employee's prior employers, the sales department must not market the process as a scientific breakthrough. Similarly, other security precautions, such as marketing software in object code only or indiscriminate use of confidentiality stamps and client nondisclosure agreements, can wreck even a meritorious defense. A judge or jury, faced with unfamiliar subject matter, is going to wonder why elaborate measures were taken to protect information which is not supposed to be secret.

Need for Protection

Undoubtedly the adoption of the guidelines set forth in this article would result in greater constraints upon corporate conduct than are generally observed today and would require more management time and expense. Of course, opinions may differ as to what guidelines are warranted. But few people would quibble over stringent controls upon the use or disbursement of cash, and information is fast becoming a close surrogate of cash in our society.

As information constitutes an ever-growing proportion of company assets, and as its processing and manipulation comes to constitute a greater share of company activities, the absence of controls over the use and disbursement of information becomes a more serious shortcoming. The value of information mandates the adoption of formal decision-making procedures to protect that information from unauthorized use, both within and outside the company.

Legal protection and security measures need to be coordinated in an information management strategy throughout each division and department of the company. Otherwise, companies risk needless and serious losses of a valuable commodity which, in an intensely competitive market, can be disastrous.

About the Author

Robert A. Spanner is an attorney with the San Francisco-based firm Severson, Werson, Berke & Melchior. Besides the upcoming book from which this article is excerpted, he has published articles on computer contracting and white-collar crime.

Spanner is a member of the science and technology section and the section on patents, trademarks and copyrights of the American Bar Association. He is chairman of the section on science and technology of the Commonwealth Club of California. He is also a member of the privacy committee of the ABA criminal justice section.‡

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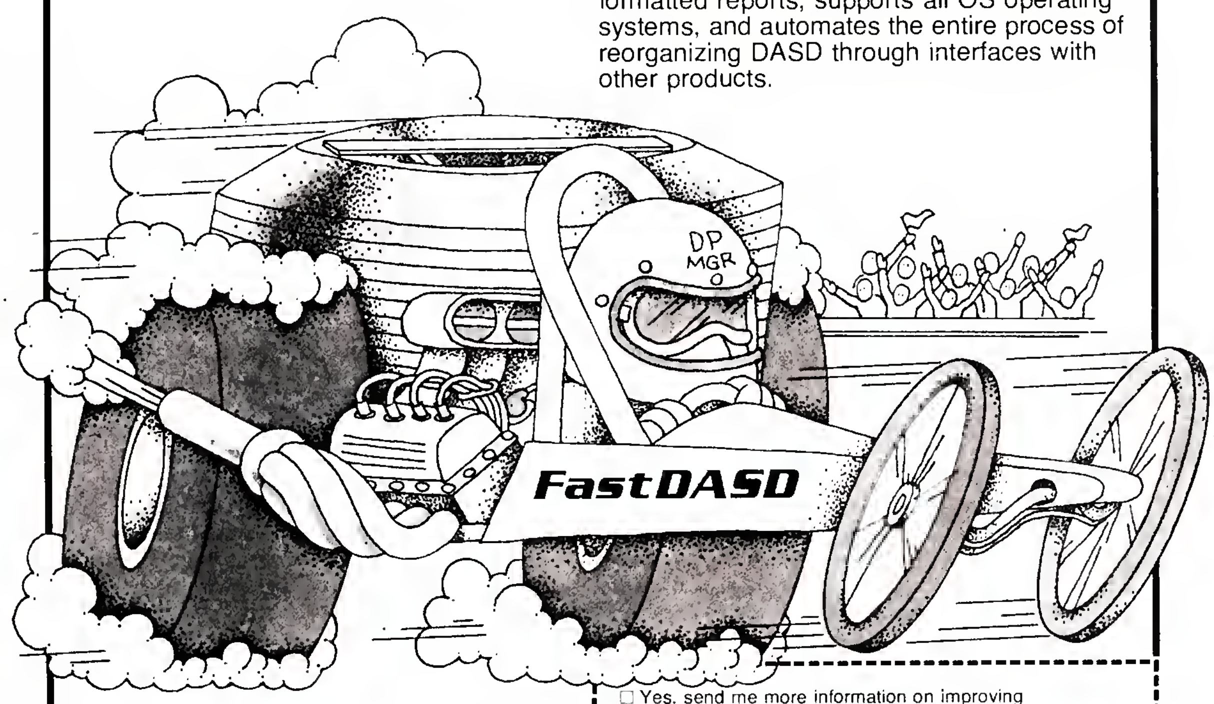

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EDITORIAL

Contract Disclaimers

The recent U.S. Court of Appeals decision upholding a fraud verdict against NCR Corp. [CW, Sept. 20] is notable for the size of its award — $2.3 million. But the ruling is most notable for the treatment of damage disclaimers included in NCR's sales contract with the user.

In its appeal, NCR sought relief from some of the damages awarded to The Glovatorium of Oakland, Calif., on the basis of contract disclaimers. Such disclaimers in one form or another are incorporated in the language of many, if not most, vendors' contracts, including those of NCR.

NCR's appeal was shunned by the appeals court once breach of warranty and fraud were established.

Users should be aware that two courts now have held that the guarantees and representations averred in a vendor's warranty package take precedence over the language of consequential damages disclaimers. These disclaimers or universal agreements may result in a judge ordering that a suit be settled in binding arbitration. A user, however, is by no means shut off from relief.

Some analysts have suggested that users simply refuse to sign contracts containing language that attempts to protect the vendor from liability from consequential damages (damages suffered as a consequence of a system's not performing as per its warranty).

Further, even relatively small users should not be afraid to speak out should they feel they have been victimized by deceptive sales or promotional practices. Both the magnitude of punitive damages awarded the dry cleaner (gross annual sales abut $1 million) and the district court judge's admonitions and chiding directed at NCR make it clear the courts will likely side with any user where vendor fraud and misrepresentation are apparent.

Conversely, users should be warned that judgments and verdicts vary from court to court and that user suits are often based upon existing state laws, which similarly vary widely from state to state. By no means should users be lured to court solely by the glitter of potentially large settlements or by the exhortations of a growing flock of computer fraud attorneys.

By the same token, vendors would do well to heed the subtle and overt messages emanating from the courts.

DATA PAST

Five Years Ago
Sept. 19, 1977

NEWPORT, R.I. — A century of sailing tradition was challenged here during the 23rd America's Cup Challenge Races as an outsider gained the role of helmsman for the American defender *Courageous* and computers moved on board many of the contending yachts.

Ted Turner, who was sailing *Courageous,* clearly did not fit the image of the aristocratic gentleman yachtsman and in fact was called the "mouth of the South" along the docks here.

— — —

Almost all large IBM computer users considered switching to alternative mainframes and two-thirds went as far as evaluating the independent CPUs, according to a *Computerworld* survey of 370/158 and 370/168 users.

Ten Years Ago
Sept. 13, 1972

SALT LAKE CITY, Utah — A programmable front-end processor that supported non-IBM terminals as well as replaced IBM communications controllers was introduced by Sperry Univac.

The 3760 communications controller was said to be plug-compatible with the IBM 360/370 mainframes and marked Univac's initial offering as an IBM replacement vendor.

— — —

SAN JOSE, Calif. — Information Systems Design (ISD) was awarded damages amounting to $300,500 in its civil suit against University Computing Co. (UCC) and two UCC employees.

The suit alleged that the UCC employees illegally accessed ISD's computer and stole computer programs.

LETTERS

Not Wearing Sneakers

After reading "Tech Writers Identifiable by Their Sneakers" by Nancy Twito Morris [CW, Sept. 13], readers may have come away with the feeling that all technical writers are:

- Only in the field for the money.
- Treated like second-class DPers.
- Not given much to do.
- Bored and unhappy with their work.

For me, all of the above things are not true! Unlike Morris, I left teaching because I was bored repeating the same material five times a day. I carefully prepared for a career in software technical writing because I loved to write and found elementary programming interesting and fun.

As a technical writer, I am not treated as a second-class DPer. I work as an equal with the programmers.

I don't need to "generate high levels of adrenalin to keep awake" because I find my work very stimulating. I'm always learning something new, and I really enjoy technical writing.

For me, the day is usually not long enough to do all that I want. I don't have time to "write letters" and "create and recreate shopping lists." On the rare occasions when my work is held up pending the receipt of information from someone, I use the time to read manuals, study code, update old manuals or develop and write short documents for company use.

Simply said, I enjoy my job! I guess it goes to show you: Not all technical writers wear sneakers.

Emily Teman
Newton, Mass.

Pooled Resources

I am writing in reference to "Texas State Agencies Pool DP Resources, Cut Costs" [CW, Sept. 6]. The concept of the Texas College Coordinating Board and the Texas Industrial Accident Board sharing a computer facility was initiated in 1971 by the local IBM sales staff.

While designing a terminal-based information system for the Industrial Accident Board, IBM realized that both agencies could share the CPU and save considerable expense. Both agencies were approached with the concept and agreed with it. The system originally installed was a 360/40 with 2260s.

Credit should also go to David P. Bell, the executive director of the Industrial Accident Board in 1971, who diligently fought the battles to get the necessary budget appropriation.

William J. Slaton
Wm. Slaton & Associates, Inc.
Sacramento, Calif.

ID Problems

I have followed with interest *Computerworld's* editorials and cartoons opposing the use of a national identification number. I agree that there are many problems with this proposal in the area of personal liberties.

However, may I point out that for those of us who are law-abiding citizens and taxpayers, a national identification number already exists. It is on my driver's license, college records, tax forms, health records and so on. This number is my Social Security number which, according to the card itself, shall not be used for identification purposes.

I see very little to be gained by implementing a national identification card, which would be as easy to counterfeit as a Social Security card.

However, it bothers me to see so little attention paid by the media to the here-and-now infringements on our liberties imposed by the use of Social Security numbers as de facto national identification numbers.

Michael K. Condon
Shakopee, Minn.

SOFTLINE /Werner L. Frank‡

A New Factor in Software Distribution

'In particular, we focus here on the software distribution, a rather new phenomenon. Until approximately two years ago, microcomputer-oriented software found its way to end users either through direct sale from the author/publisher or via the hardware manufacturer and the associated retail dealer.

'This scheme, however, was not sufficient to satisfy fully the needs of the marketplace. Hence, the birth of the pure software distributor.'

In the past few columns, we have considered the changes in software marketing resulting from the impact of the microcomputer. These changes have come about for two fundamental reasons. The first is the consumer orientation of the purchaser and the second is the relatively low retail price of the software.

The significance of the latter observation, from a cost effectiveness point of view, should not be underestimated.

While the price of microcomputer software is lower than that of mainframe software by as much as two decimal orders of magnitude, the power of such microcomputer software is relatively far greater than that of similar software for mainframe products.

Sales Philosophy

The consequence of these marketplace realities has been the development of a consumer product-oriented sales philosophy accompanied by the classic components of market distribution associated with mass merchandising. Already the sales volume of some software units rivals that of hardcover "best sellers."

In certain instances, unit sales levels have even reached heights equal to those of popular musical recordings. The potential for the software market, in contrast with typical consumer products, is the higher price.

Leaving games aside, serious software, such as accounting applications, can command three-figure prices. These products compete at the same dollar level as hard goods, such as TVs, refrigerators and so on. The distinction, of course, is the "soft" aspect of the programmed product, which makes it extremely labor-intensive.

This drawback, however, is offset by certain accompanying benefits: the absence of need for raw materials, the avoidance of inventory requirements, the elimination of substantial warehousing space and compactness and convenience in handling and shipment.

All of this has been quickly recognized and the elements of a sophisticated distribution system are coming into place, ranging from the author/creator to the software publisher and the software distributor to the dealer network.

In particular, we focus here on the software distribution, a rather new phenomenon. Until approximately two years ago, microcomputer-oriented software found its way to end users either through direct sale from the author/publisher or via the hardware manufacturer and the associated retail dealer.

This scheme, however, was not sufficient to satisfy fully the needs of the marketplace. Hence, the birth of the pure software distributor.

There are, of course, many variations on this theme. Lifeboat Associates in New York City is an example of an organization that has successfully combined many roles, including those of publisher and distributor. Lifeboat actively solicits potential authors for software products that meet its standards.

On the other hand, Softsel Computer Products, Inc. of Inglewood, Calif., has adopted a different corporate strategy. This company limits its activity to that of the middleman, eschewing all proprietary interest in software production in order to preserve its role as an independent and unbiased supplier of good software to reputable dealers.

Softsel is now only two years old, but it has already become a sizable and important factor in bringing software to end users. This organization provides the following benefits to both software publishers and retail dealers:

- Makes large purchase commitments and thereby passes on portions of the volume discount to dealers who may not qualify for such discounts. In fact, Softsel provides an advertised automatic 40% discount from retail price for virtually all software, even on the first unit sold.
- Inventories software at levels that can meet varying dealer demand levels. Softsel promises 24-hour shipping response, which is reportedly accomplished 99% of the time.
- Screens available software and performs a third-party quality assurance checkpoint. For example, Softsel has an in-house technical staff of eight that tests a product and, if acceptable, endorses it for subsequent distribution.

It might be argued that the above benefits can be achieved by individual dealers working directly with software authors and/or publishers. Indeed, this is sometimes the case.

Direct Dealing

However, both parties to such arrangements frequently discover that the disadvantages of direct dealing outweigh the advantages. The publisher soon tires of handling small unit sales as well as interfacing with many organizations, most of which would strain the publisher's resources with demands for subsequent support.

On the other side of this coin, dealers find it a continuous struggle to keep fully informed about what is going on in the industry. It is virtually impossible for dealers to remain technically competent and able to discriminate accurately among so many software offerings.

By way of further support, Softsel makes available to the dealer the findings of its in-house technical staff. This assists the retailer in prod-

(Continued on Page 58)

HUMAN CONNECTION /Jack Stone‡

Some Tips on Training Terminal Operators

This is the fourth article in a six-part series, "Trials of a New Terminal Operator," coauthored with Joanne Barker.

Although everybody agrees that formal training — either classroom level or small group tutoring — is highly desirable if newly hired terminal operators are to reach performance expectations early on, I think you'll have difficulty uncovering such programs in many organizations.

The basic reason underlying this paradox is that terminal operators are perceived by a large segment of the management population as low-level administrative personnel whose importance, at best, rivals that of the building custodian.

Surely you've overheard fuzzy-brained supervisors utter such nonsense as: "Why *bother* training them? It won't ever eliminate their errors completely and, what's more, if they get too knowledgeable they'll surely up and leave the company for a better paying job. Why don't we just face facts: The vast majority of terminal operators are not really interested in their jobs and are generally incapable of doing what has to be done."

This approach often results in a self-fulfilling prophecy. A negative, or even neutral, management policy toward training — or other topics of personnel development for that matter — will more than likely beget employee antagonism, if not hostility, an attitude that hardly encourages stellar performance on the job.

On the other hand, a properly planned and implemented training program — scheduled and staffed appropriately — not only develops operating skills, but also tends to improve attitudes and, as a result, increases effectiveness on the job.

Development Guidelines

It might be useful to review some basic development guidelines here, with the usual caveat that a specific training program must be designed in the context of a particular business environment.

- If possible, terminal training should be organized into short segments of one to two full days during which attendees are totally released from their jobs. This strategy helps to focus attention on subject matter before "saturation" sets in.

In between sessions, on-the-job-training assignments should be made that reinforce topics covered during the formal training.

- It should be emphasized that a simplified discussion of computer basics is necessary early on. Also required is a blackboard-type discussion of the concepts of the application system to which the attendees will interface.

This should include a general presentation of the objectives of the system, major operational steps, key inputs and outputs and the processing functions performed.

Special mention is made of this point because many training programs deal almost entirely with terminal operational procedures.

This approach ignores the need to develop a "systems understanding," which is an appreciation of overall systems operations that positions the terminal operator as a member of an important business activity.

This knowledge is key to building positive attitudes, confidence in handling the terminal and, if done properly, pride in the operator job.

- Naturally, the training should be organized into "hands-on" sessions that are introduced by the instructor (or tutor).

It is therefore suggested that terminal operator documentation be reviewed as part of the formal program, but not until later on, and then "spoon-fed" to the students under the close supervision of the instructor.

The reason is that typical terminal documentation can overwhelm an operator trainee and is best presented after the student becomes familiar with system operations.

- Finally, training time should be assigned to the determination and resolution of routine operational problems.

It's hard to find any situation more frustrating to an operator than being unable to deal with simple deviations from standard procedures.

Letters to Stone should be addressed to him at Box 270, 1377 K St. N.W., Washington, D.C. 20005.

LETTERS

DP Education

I just read "Lack of Good Teachers Marring DP Education" [CW, Sept. 13]. I wonder if the words "vocational schools" are supposed to include two-year technical colleges.

I taught 10 years at Shawnee State Community College and then became one of the teachers lured away to industry.

During those 10 years, the graduating class was never more than 12 students and the drop-out rate from the first day of the first year until graduation was over 65%.

The product produced was good. When a company comes back for more graduates after they hired the first one, it shows they liked the product.

One answer to getting good teachers could be arranged by school administrators talking to big business. Most large data centers with six or more programmers could arrange to have one of their programmers teach school during the day.

This programmer would report to the school Monday, Wednesday and Friday from eight to 12 or from one to five. They would put in 12 hours of student contact each week.

Pay the programmer/teacher a full teacher salary since class preparation and other homework would be required. The company would pay the programmer for the hours worked in its office.

Everyone profits by this plan. A little pencil-work will show the programmer/teacher will be well paid. The company can see what is taught and can make suggestions to improve the training.

The firm can also learn about the students before graduation and would know who might fit in the company after graduation. The school selects the teacher, and it would be someone that is actually using a computer.

The students can learn from a teacher who works at what he teaches.

Robert J. Decker
Lucasville, Ohio

More on Audit Firms

As an MBA, certified public accountant, fiscal administrator for 30 years, interested observer of the role of DP in manufacturing companies and a "client" of both audit and management service staffs of several Big Eight CPA firms, I think I have some insight into the problem that was discussed in the editorial "Don't Quote Me" [CW, Aug. 9].

Should a DP manager have cause for concern if the audit firm is brought in by his management for DP consulting services? Of course he should. In fact, he should be concerned whether it is the audit firm or some other consulting group.

The hiring of DP consultants is symptomatic of a communications breakdown between DP and users. The right consultant, with a proper understanding of his role, can function to rebuild mutual understanding and confidence between DP and users.

When the consultants start to deviate from their roles as communicators, that is when the DP manager is in trouble. The consultants will always have the ear of management more than the DP manager does. If the consultants are also the audit firm, they have more clout.

Functioning as other than communicators, consultants are not noted for their following the rule: "If it ain't broke, don't fix it." How else can they create the illusion of progress unless they "fix" something?

When it comes to fixing things, some consultants have been known to apply their approved solution to a problem that isn't the problem at all. DP managers be concerned, but don't panic.

Hibbard A. Smith
Tulsa, Okla.

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters may be edited for purposes of brevity and clarity. Letters should be addressed to Editor, *Computerworld*, 375 Cochituate Road, P.O. Box 880, Framingham, Mass. 01701.

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READER COMMENTARY /Barbara Gardner‡

The Revenge of the User

Why your users would want to get back at you may be beyond your comprehension. After all, you have written the best system that has ever been written to date, right?

Regardless, following are the unwritten rules with which each user is indoctrinated as soon as he receives his first CRT terminal:

1. Whenever someone from DP approaches you with questions concerning a new project, always make sure to be too busy to answer him.

2. Always wait until a program is finished before you disclose what it was you really wanted it to do.

3. If someone from DP corners you and forces you to answer his questions, always make sure your answers are vague and misleading.

4. Remember what you learned in political science class: Always answer a question with another question. For instance, "When will this program be done?"

5. When a new program is finally introduced, go out of your way to see if you can make it fail.

If at first you don't succeed, try again and again and again and again.

6. If you can't get it to fail, lie about it.

It doesn't matter that you can't get it to fail again when someone from DP is standing right beside you. Making him think it might have failed is enough to ruin his day.

7. If you know there is a problem with a certain program, make sure it shows up when you are demonstrating your system to an outsider. Then explain in elaborate detail how it is supposed to work.

8. Complain to everyone else that a certain program doesn't work, but never tell DP so that they have a chance to fix it. Just keep complaining to everyone else.

9. If a program did something strange, always forget what you did immediately before it happened. This will keep DP from getting an idea of what caused the problem, so it will take them longer to correct it.

10. If DP somehow manages to write a program that does everything you want it to and none of the things you wouldn't want it to, never admit it.

11. If you are at a remote site, call every 10 minutes when the line goes down to let them know it's not up yet.

12. When a new computer is installed, complain about all the differences between the old computer and the new computer, even though the changes make your life a whole lot easier.

Gardner is DP manager for Callahan Chemical Co. in Palmyra, N.J.

LETTERS

Easy Solution

In reference to Big Eight consultants recommending personnel changes ["Don't Quote Me," CW, Aug. 9]:

If the consultant does not understand the problem and does not have a clue as to how to go about solving it, then it is easy to recommend management personnel changes; maybe the replacements will do the consultant's job by coming up with the solutions.

This problem is not exclusively a Big Eight problem. It can occur anytime unqualified consultants are engaged. Don't allow programmers or management trainees to be assigned to do management audits.

Frances Smith Abernathy
President
Abernathy Business
Consultants, Inc.
Rockville, Md.

To: Northern Telecom Inc., P.O. Box 1222,
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LETTERS

Advantages of Julian Dates

We should use Julian dates instead of the Gregorian calendar in our data bases and programs. I'll explain why, but first I'll clear up a possible confusion regarding the term "Julian date." Many people in our business believe that a Julian date is composed of the year and the day of the year; for them the "Julian date" corresponding to Jan. 1, 1983 (Gregorian) is [19] 83.001.

That is not a Julian date. A Julian date has no year in it; it is a serial number associated with a given Gregorian date, serial number 1 having been assigned to a day thousands of years in the past. The Julian date for Jan. 1, 1983 is in fact 2 445 336.

Now for some advantages of using Julian dates. I emphasize that I do not advocate entry or display of Julian dates. I merely urge that all dates be carried internally in data bases and so on in Julian form and converted from and to Gregorian form as necessary.

Many applications require the number of days between two dates or the date some number of days before or after a given date. Most shops have more or less elaborate subroutines to do the calculations. Using Julian dates, the process is simplicity itself — just add or subtract.

It's often necessary to determine the day of the week on which a given date falls. The information is much more easily obtained from the Julian form than from the Gregorian form. Just take Julian date modulo 7. If the result is zero, the day of the week is Monday; if 1, it's Tuesday.

For binary hardware, the Julian date will fit nicely into 32 bits. Indeed, 24 bits will do through Monday, May 9, 41222.

The 21st century looms. Some problems may arise from the widespread practice of carrying only the last two digits of the year. These problems wouldn't arise through the use of Julian dates.

Interconversion of Gregorian and Julian dates is easy. Henry F. Fliegel and Thomas C. Van Flandern published a pair of excellent algorithms in 11 Comm ACM 657 (October 1968). As an exercise in hand optimization, I coded the algorithms as reentrant subroutines for IBM 360/370 CPUs, invocable by Cobol, Fortran, PL/I or assembler callers.

Together, the subroutines occupy about 320 bytes. On an IBM 3033 CPU, Gregorian to Julian conversion takes about 12 microseconds; going the other way takes about 14.

The Fliegel and Van Flandern algorithms are nicely tolerant. For example, if a bank lends on a 180-day note on Nov. 22, 1982, it can find the due date by feeding Nov. 202, 1982 to the Gregorian-Julian algorithm, which will absorb it without a hiccup.

Data base designers might do well to carry Julian dates in the physical data base, accepting and presenting Gregorian dates in the logical counterpart, thus rendering interconversions invisible to the user.

Richard L. Conner
San Francisco, Calif.

New Trends In Marketing

(Continued from Page 55)

uct support and provides merchandising ideas and sales tips to aid the marketing effort.

The dealer also periodically receives a personalized inventory control report showing sales trends and stocking status. A 30-day evaluation period and 90-day return policy for slow moving merchandise complete the service functions.

Indeed, it is these relationships and tasks that are undertaken by the middleman distribution organization, giving it an important role in the marketplace.

At the very least, this is attested to by the rapid growth and success of organizations such as Softsel and the dozen or so competitors that have sprung up across the country.

Softsel is now producing sales at an annual rate of $25 million, measured at the wholesale price, which is typically about 60% of the retail list price. Softsel represents more than 100 publishers and markets to 1,500 retail dealers.

Softsel catalogs about 1,700 line items of software, roughly distributed, 60% in the entertainment category, 5% in operating systems and utilities and 35% in business software. This catalog is updated every month and is supplemented by newsletters, a best-sellers list, promotional material and a toll-free hotline.

The software is primarily applicable to Apple Computer, Inc., Atari Corp., Radio Shack's TRS-80, the IBM Personal Computer and the entire class of computers that support CP/M.

In order to continue to provide rapid turnaround service through overnight mail and other means, Softsel stocks more than 100,000 units in its two warehouses, occupying 50,000 square feet. It is quite remarkable to walk through the bins of a software warehouse and see racks of boxed diskettes ready to be packed and shipped.

Techniques for distributing software are, of course, in their infancy today. We can expect a proliferation of many new methods in the coming year as the number of packages and number of users increase tenfold.

Frank is executive vice-president of Informatics General Corp. in Woodland Hills, Calif.

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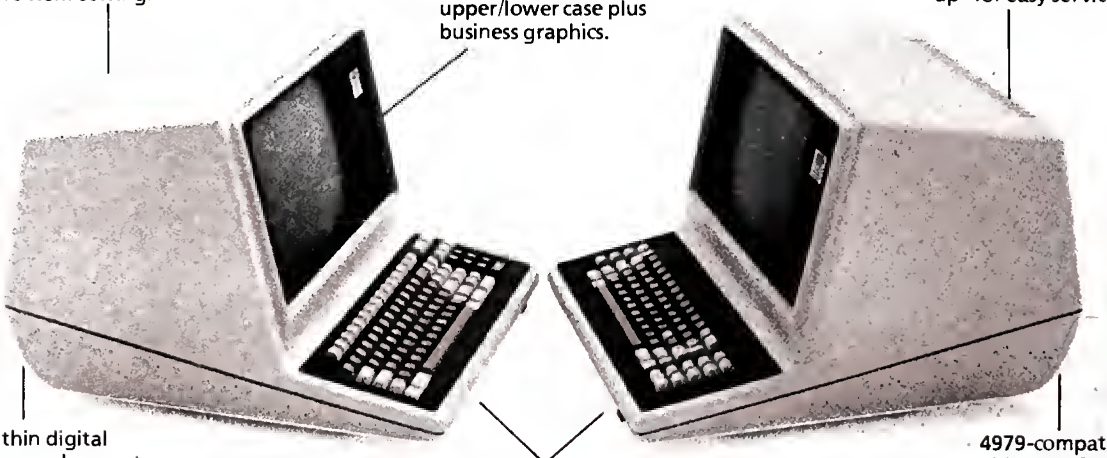

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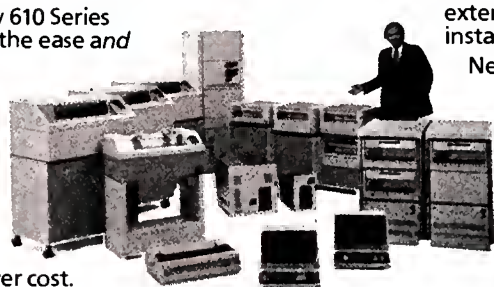

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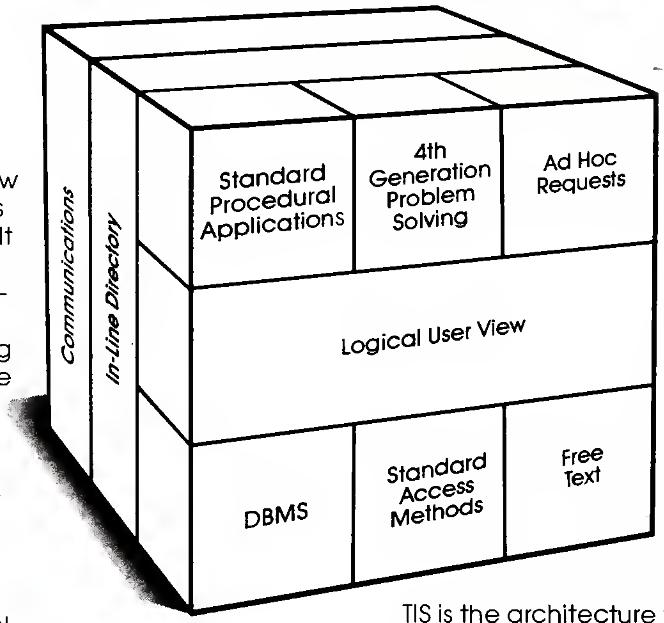

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Unifies Operations

Church Buys Software Before Hardware

By Susan Blakeney
CW Staff

NEW YORK — Picking out software before buying the hardware might be considered similar to putting the cart in front of the horse, right?

Not so, Rev. Robert C. Tomlinson, manager of data processing for the United Presbyterian Church, said. His decision to purchase Miningham & Oellerich, Inc.'s (M&O) accounts payable, accounts receivable, order entry/inventory and general ledger packages drove the decision to acquire a 5930 mainframe from Burroughs Corp.

The New York DP headquarters services the church's 9,000 separate U.S. congregations. Among its responsibilities are keeping track of student loans granted by the church, grants, church publishing activities and more. Tomlinson is shooting for a staff of 30 by early 1983, and he recalled his implementation story for *Computerworld.*

In 1980, the church decided to analyze its data processing needs. For 15 years, it had been using an early generation computer, a Honeywell, Inc. 1250 system with antiquated software. The church engaged the firm of Price-Waterhouse & Co. (P-W) to prepare a five-year plan outlining its short- and long-term data processing requirements. As well as recommending several staff additions, the P-W report addressed the church's need to integrate data across 10 organizational entities at the national level.

By July 1981, 75 church user/managers and operations personnel were schooled by P-W on how to evaluate computer software and hardware. This group detailed the church's current procedures and information needs and sent its resulting request for proposal to 35 software vendors. Of the 20 respondents, the contract went to M&O.

"P-W recommended we go to a batch system because the organization was so naive technologically," Tomlinson recounted, "But the users voted for the application packages, and they came up with the specifications through their interviews.

"M&O's philosophy for modifying particular applications appealed to us," according to Tomlinson. He said there were "big gaps" in other vendors' solutions, and so far he is pleased with his choice.

"We've unified and streamlined a lot of our operations, and we've been able to improve services to our users," he said.

Tomlinson also noted that the new system will significantly improve the way information flows through the church and foresees many functions becoming automated. He said he believes the system will lead to better decision making and is planning to implement a decision support system to see that this happens. "Upper management is becoming more aware of the system's potential," Tomlinson claimed, "and thus, the organization is being revitalized because of the education that's going on here."

GTE On-Line Net Will Serve Medical Practices by October

MCLEAN, Va.— Beginning the first of next month, doctors, hospitals and clinics across the nation will be able to access any of four medical data bases for $25/hour to $27/hour using a new on-line information network. They will also be able to send messages to and from each other for as little as 12 cent/min.

Developed by GTE Telenet Communications Corp., headquartered here, the new network will interface customers with AMA/Net, an on-line information service operated by the American Medical Association (AMA) from a nearby computer center.

The subscriber can use "a wide variety" of video and/or printer terminals, according to GTE Telenet. He will communicate with the data base center through dial-up phone lines — in most cases, just by dialing a local telephone number.

There are about 450,000 doctors and 7,000 hospitals in the U.S. GTE President and Chief Operating Officer Thomas A. Vanderslice said he expects the new network to become "the largest and most extensive of its kind ever developed."

One of the four AMS/Net data bases describes in detail more than 1,500 individual drug preparations marketed under about 5,000 trade names throughout North America. The other three data bases consist, respectively, of frequently updated disease descriptions; a bibliography of legislative and other nonclinical aspects of health care, encompassing more than 700 publications; and a listing of the standard codes used by insurance companies and similar agencies to denote medical services performed by physicians.

AMA/Net also includes an electronic messaging service, dubbed Med/Mail, which, in addition to immediate message delivery, allows the subscriber to order documents listed in the bibliographic data base. Med/Mail also includes a bulletin board containing information on upcoming AMA meetings and medical continuing education courses. Within the near future, subscribers will be able to register for the courses on-line, GTE Telenet said.

Henco Tool Combines DP, WP Data Into Its Info Relational DBMS Software

WALTHAM, Mass. — Henco Software, Inc. has announced Info*Text, a software package intended to consolidate information from data processing and word processing systems into its own Info relational data base management software.

Implemented on Prime Computer, Inc.'s Prime Series 50, Info*Text reportedly manages structured data from the host computer as well as lengthy, unstructured data from a word processing system tied into the host system. The vendor said it is geared toward applications that involve either storing or searching lengthy documents that contain data that later must be accessed and manipulated to gain specific information for reports and other uses.

One of the search techniques the Info*Text package includes is concordance, which reportedly points to every occurrence of a specific word in a data base. It also has a built-in dictionary and synonymns list, as well as the ability to perform proximity search using key words.

Users of the system can enter items for updating using any terminal that is compatible with Prime hardware that supports a full-screen text editor, the vendor said.

In addition, Info*Text features a word processing option, which was designed to provide sophisticated text formatting capabilities.

Info*Text takes advantage of all the capabilities of the Info relational data base management software, the vendor noted. The package is available immediately and is priced at $20,000. The text formatting option is priced between $7,800 and $12,500, depending on the capabilities selected.

Henco Software is headquartered at 100 Fifth Ave., Waltham, Mass. 02154.

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IBM Users Get 'Spoolprint'

PITTSBURGH, Pa. — Westinghouse Electric Corp. has introduced an on-line spool management system, which directs a report or any part of a report residing in IBM's Power/VS(E) output queue to local and remote on-line printers.

Spoolprint is targeted for IBM DOS/VS and DOS/VS(E) installations that use either the Westinghouse Westi or IBM CICS teleprocessing control system. It reportedly facilitates the continued use of batch applications, which write SYSLST output. A batch job can be extracted or copied from the reader queue, then viewed or printed at local or remote terminals, the vendor said, thus extending the life of many batch applications. With these features, the product reduces mail costs and speeds turnaround time, according to the vendor.

This product is priced at $3,000 for the Westi version and $4,000 for CICS on a full payout lease basis. Further details are available from Westinghouse Electric's Industry Automation Division, 2040 Ardmore Blvd., Pittsburgh, Pa. 15221.

'Pride-ASDM' Gains CICS Support

CINCINNATI — M. Bryce & Associates, Inc. (MBA) has announced the addition of IBM CICS support to its Pride automated systems design methodology (ASDM).

Pride-ASDM is an integrated and automated approach for building information systems, which currently run on mainframes and some minis from companies including IBM, Digital Equipment Corp. and Control Data Corp., according to a vendor spokesman.

It acts as a productivity tool in the areas of systems management, data management, documentation management, project management and information resources management.

With the CICS support option, analysts can create component specification during the development process and can search or reference these components as well, the vendor said. The new feature reportedly supports MBA's Information Resource Manager, Automated Design Facility and Automated Instructional Materials, all of which are included in Pride-ASDM.

The primary purchase price for the base product is $80,000, and the CICS option costs $7,000. Pride also supports IBM's TSO and CMS environment, an MBA spokesman said from 1248 Springfield Pike, Cincinnati, Ohio 45215.

Tutorial Aid Out for Accountants

ATLANTA — An on-line tutorial facility to provide accountants with instant access to instructions has been introduced here by Management Science America, Inc. (MSA).

Called Help, this product is available to all users of MSA software, and reportedly includes simple instructions for operating each on-line screen with the MSA application being used. Help also informs users about each screen's purpose, how it should be used and how to correct errors made during entry.

This product is free to on-line MSA customers with maintenance contracts, MSA said from 3445 Peachtree Road N.E., Atlanta, Ga. 30326.

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It's a rare graphics system that can produce business graphics and also operate as an engineering work station for under $20,000. The Beacon™ System from Florida Computer Graphics puts it all right at your fingertips.

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With the addition of 640KB of optional graphics memory, Beacon's 640 X 480 resolution can create a 1280 X 960 addressable image, typical of many CAD/CAM applications. This higher resolution, combined with the standard BeaconROAM™ and Zoom features, makes Beacon ideal for many engineering and scientific applications.

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Beacon works with joysticks, light pens, digitizer tablets, printers or plotters. It also interfaces with slide cameras, color copiers and even large screen video projectors.

For generating either business or engineering graphics, the Beacon System (stand alone or host dependent), offers a spectrum of capabilities unmatched in its price category. To find out more write for our full color literature:

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'Manman' Gets Service Module

LOS ALTOS, Calif. — Ask Computer Systems, Inc. has added a field-service product to its Manufacturing Management (Manman) information system.

Called Manman/Serviceman, the new product reportedly provides complete field-service job reporting and contract maintenance for manufacturers that offer warranty repairs and scheduled maintenance under service contracts. Like other Manman products, it is on-line, interactive and user-based, the vendor explained.

The product costs $60,000 if purchased separately and $20,000 for customers already using Manman, a spokesman at Ask said from 730 Distel Drive, Los Altos, Calif. 94022.

Graphics Tool Fits VAX-11

OLD LYME, Conn. — QTech Associates has unveiled a graphics package called Qplot for users of 32-bit Digital Equipment Corp. VAX-11 processors running under the VMS operating system.

This device-independent graphics software is written in Fortran and contains the Qplot library, which includes routines for two-dimensional plotting, mapping, flowcharting and more for graphics images on a variety of graphics devices, the vendor said.

Qplot offers two basic modes of operation: it can output directly to a selected device during program execution, and it can produce an intermediate plot file during program execution.

The intermediate plot file then can be directed via the post-processor to selected devices without costly re-execution of the application program, according to a spokesman for QTech Associates.

A one-time proprietary single-CPU license agreement for the Qplot package costs $4,500. QTech can be reached through P.O. Box 952, Old Lyme, Conn. 06371.

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'Meridian Program' Provides Date Handling for IBM 370 Users

ASTORIA, N.Y. — Saunders Communications, Inc. has announced the Meridian Program, a date processing module for IBM 370 users that the company says is guaranteed accurate to the year 2050.

The program reportedly replaces existing date programs with a module that edits data to determine valid dates, converts dates to nine different output formats, adds or subtracts a specified number of days to a date, determines the number of days between two dates, locates the next specific day of the week and locates the end of the month.

The module functions for all dates from Oct. 15, 1582 to Dec. 31, 9999. Dates up to 273 years apart may be subtracted from one another, the company reported.

The Meridian Program is available for $500 plus $10 shipping and handling from Saunders Communications, 30-11 47th St., Astoria, N.Y. 11103.

System/38 Gets Financial Package

CLEVELAND — Pioneer Software, Inc. has announced a financial package for use on the IBM System/38 processor.

Package modules reportedly include general ledger, accounts receivable, accounts payable, order entry and invoicing, fixed assets, purchase-order inventory control and project tracking.

The systems are said to use RPG-III-structured coding, provide both source and object code, use data base files and data dictionary references and provide system user and program documentation.

Each module is available for under $5,000, a spokesman said from 10302 Madison Ave., Cleveland, Ohio 44102.

Graphics Package Aids IBM 3277

PORT CHESTER, N.Y. — IBM has introduced an Interactive Presentation Graphics software package designed to enable users of IBM and plug-compatible mainframes to create, modify and display pictures using the IBM 3277 terminal.

The software reportedly can be used to draw monochrome or color pictures on paper, viewfoils, color slides or flip charts. Line art objects can be created as original art or can be built from existing objects distributed with the Interactive Presentation Graphics system, the vendor noted. For example, a picture could be created using corporate symbols, original drawings and text.

The pictures are created interactively using the IBM 3277 Graphics Attachment request-for-price-quotation terminal, the vendor added. Changes can be made during the creation process or after the picture is completed and stored as a file.

There is an initial license charge of $1,065 for the software and $355 for 24 consecutive months. Further information can be obtained from IBM at 900 King St., Port Chester, N.Y. 10573.

Utility Package Fits System/34

OAK BROOK, Ill. — Business Computer Design, Inc. has announced the release of a utility package called Manage/Mint for users of IBM System/34.

Manage/Mint features three bar graph reports, including a Disk Seeks graph, showing the number of seeks that occur on each drive over a period of time; a Net Swapouts graph; and a Memory Usage graph, the vendor explained.

The Job Analysis by Time Report feature reportedly is the heart of the package, allowing access to information including disk drive location for each library and file used, job priority, calling procedure and programs used in a job run.

The package also includes a library characteristics report and indexed file keysort module and a libraries missing from disk reports module. Manage/Mint sells for $950, the vendor said from Suite 280, 900 Jorie Blvd., Oak Brook, Ill. 60521.

'Screen' Runs On DEC Minis

BURBANK, Calif. — A utility written to run on the Digital Equipment Corp. PDP-11 and LSI-11 minicomputers and designed to improve data entry for the end user has been announced by Applied Computer Products Corp.

Screen, written in Macro-11, offers data entry operators limited word processing functionality within entry fields, the company said. Its formatting utility automatically inserts slashes in dates, parentheses around area codes, a hyphen in between the exchange prefix and the last four digits of a phone number.

In addition, data entry information is automatically edited to insert leading blanks and trailing zeros, justify the data within the record field and properly format negative numbers, the vendor said.

Screen carries an end-user price of $1,500 and is available from the company's marketing agent, Glenn A. Barber & Associates, Suite 304, 15010 Ventura Blvd., Sherman Oaks, Calif. 91403.

How MSA can
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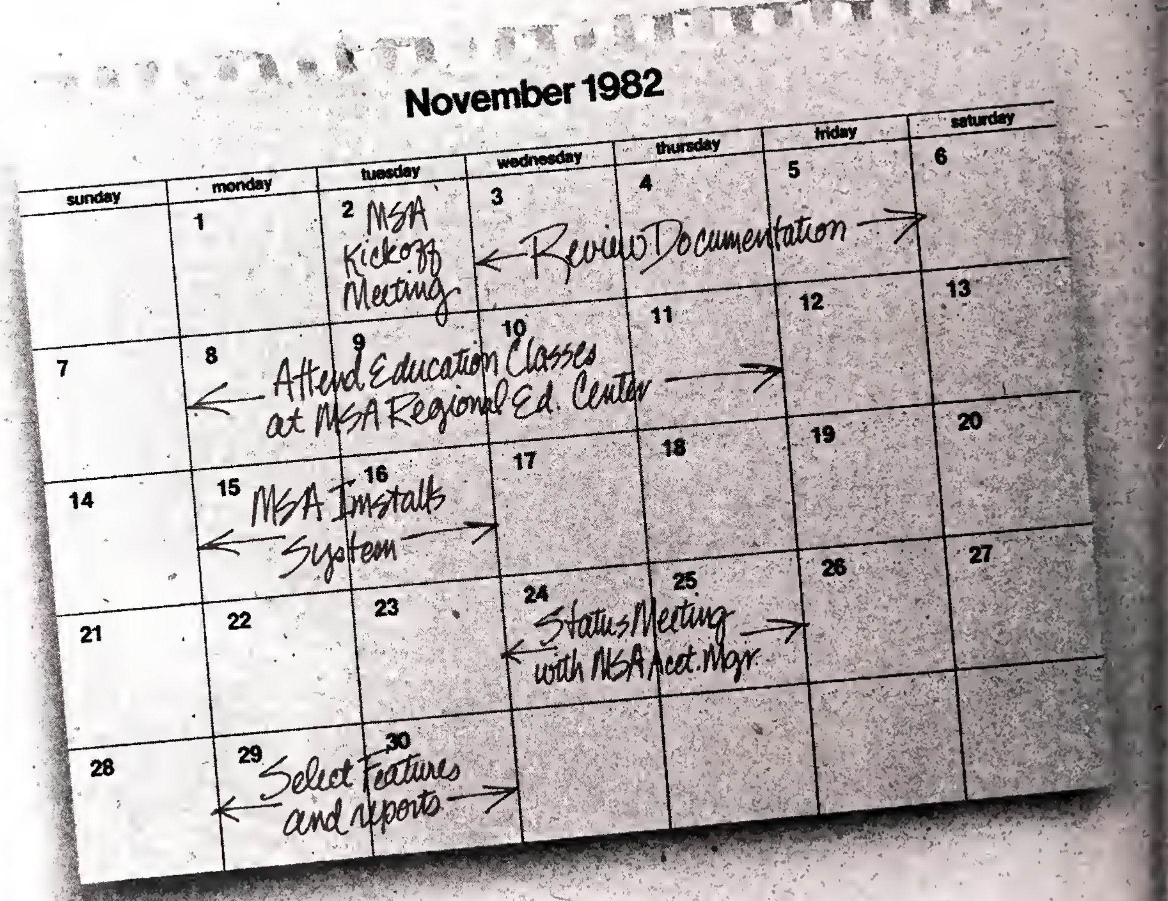

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Dibol Package Targets PDP-11s

MONTROSE, Calif. — Mini-Computer Business Applications, Inc. (MCBA) has announced its Standard Product Routing (SPR) manufacturing package in Dibol for Digital Equipment Corp. PDP-11s.

SPR is said to facilitate effective routing by handling data concerned with operations, tools and notes used in standard product manufacture. SPR requires MCBA's Inventory Management (I/M) package and can interface to three other packages in the manufacturing system.

Source code licenses for SPR are $2,000 for 10 uses; I/M costs $4,000 for 10 uses. MCBA is headquartered at 2441 Honolulu Ave., Montrose, Calif. 91020.

RJ-11 Compiler Cut 50% in Price

SUDBURY, Mass. — EEC Systems, Inc. has announced a 50% price cut for its RJ-11 Cobol Compiler for the Digital Equipment Corp. PDP-11 family of computers.

The new pricing policy aims to bring the firm's RJ-11 Cobol pricing more in line with its competitors and to capture more of the market share, a company spokesman said.

RJ-11 Cobol is Ansi 74-compatible and comprises a compiler and a run-time system. The product is available on the DEC PDP systems running under the RT-11, TSX and RSTS/E operating systems. Prices for a single CPU license start at $1,250 from the firm at Mill Brook Park, 327/E Boston Post Road, Sudbury, Mass. 01776.

Announces Two Product Updates

Pansophic Acquires O-W-L

OAK BROOK, Ill. — According to a series of recent announcements, Pansophic Systems, Inc. has acquired the O-W-L on-line software environment from NCI, Inc., released version 2.0 of its PRO/grammer software and also unveiled Version 9.0 of Easytrieve, its information retrieval and data management system.

O-W-L was designed for program design, development and library management and can operate as an independent teleprocessing monitor or under IBM's CICS, the vendor said.

This product can reportedly be used with Pansophic's Panvalet source library-control and management system.

It costs $20,000 for the IBM DOS version under CICS, $23,000 for OS under CICS and $28,000 for the independent teleprocessing monitor, according to the vendor.

The new version of PRO/grammer is being offered as a separate product and includes the following features: Instream Macros, enabling macro statement to be included in the source input to PRO/grammer, several new exit routines, a cross-reference feature and the ability to nest in "if" statements, the vendor said.

It costs $25,000 for DOS and $35,000 for the OS version.

Finally, Easytrieve 9.0 enhancements include Sortcore, a method for specifying the DOS sort storage method; Device, which indicates the DOS device type for both input and output files; Cisize, which provides a method for establishing the control interval size for DOS sequential output files; and several new file statement parameters.

This product is priced at $14,500 under DOS and $19,900 for OS.

The vendor can be reached at 709 Enterprise Drive, Oak Brook, Ill. 60521.

UCC Updates DASD System

DALLAS — Quicker data movement, automatic space release and compression have been added in Release 2.0 of UCC Three DASD management system from University Computing Co. (UCC).

Release 2.0 runs on IBM mainframes under OS, MVS and VS1, according to the vendor. It also features extended Vsam support, tighter on-line security and streamlined tape consolidation.

Release 2.0 of UCC Three DASD costs $17,000. UCC is located at UCC Tower, Exchange Park, Dallas, Texas 75235.

OS/MVS Users Get Utility Tool

OAK BROOK, Ill. — Unitech Systems, Inc. has announced the availability of a utility software package that reportedly automates the balancing and control-reporting function within the IBM OS/MVS data center.

The Unitech Audit and Control Reporting System (U/ACR) was designed for system developers, operations management and internal audit personnel, according to the vendor. It reportedly receives control totals from applications programs, retrieves additional required information from the data base, processes user-defined balancing equations and produces a standardized audit and control report.

The control totals from each program are then automatically stored in the data base by U/ACR for subsequent balancing and reporting, the vendor explained.

The price of the package is $9,450. Unitech is based at Suite 230, 823 Commerce Drive, Oak Brook, Ill. 60521.

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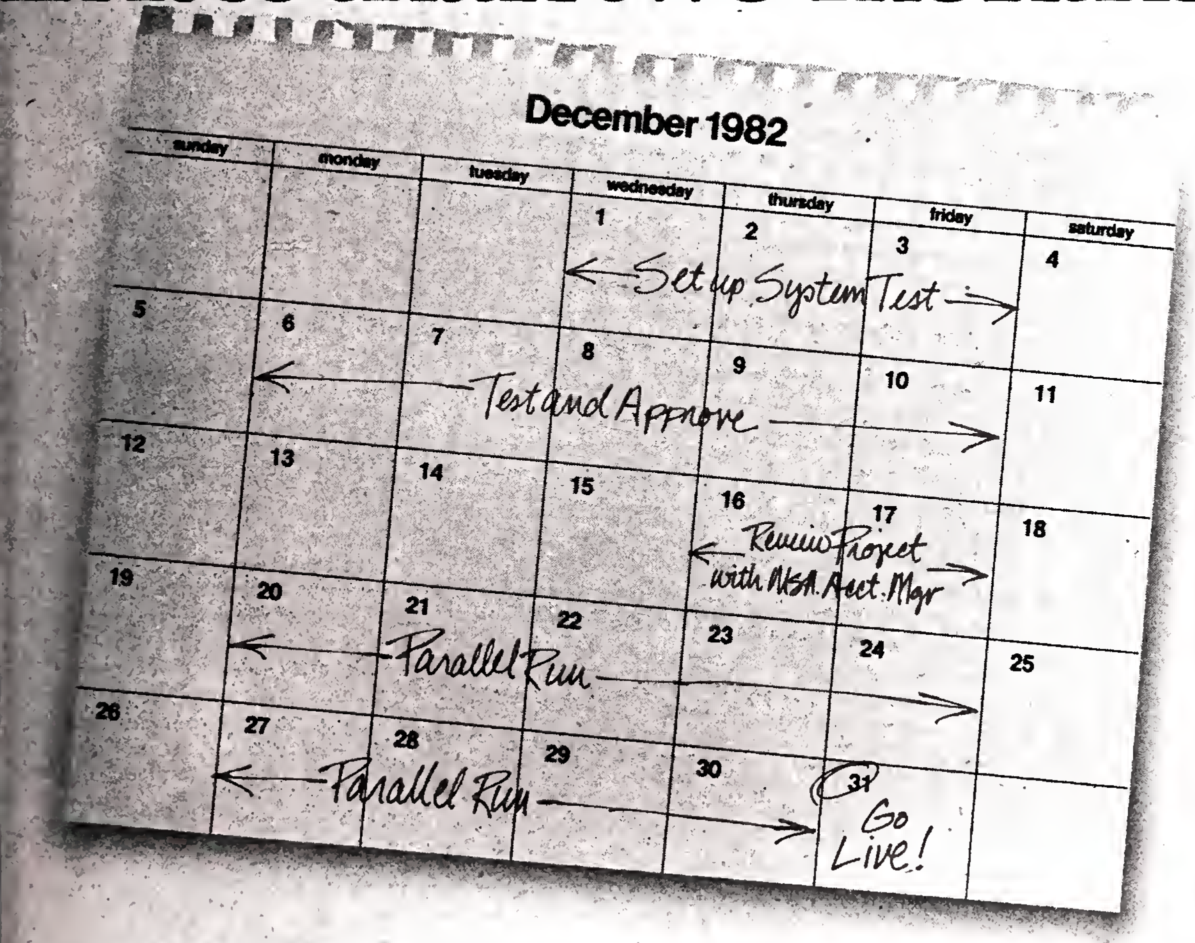

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Inventory Tool Gets Enhanced

ARLINGTON HEIGHTS, Ill. — Bakco Data, Inc. has announced an enhanced version of its Warehouse Distribution Application, tailored for distributors of meat, poultry, fish and cheese.

The Bakco Meat, Poultry and Fish Distribution Application reportedly controls inventory by pieces and/or weight. Comprehensive inventory reports are maintained in a multiwarehouse environment, as desired, by pieces and weight.

It is available to current users of Digital Equipment Corp. PDP-11s and VAX-11s. Modules are priced from $3,000 to $9,000 from Bakco Data, Suite 190, 85 N. Algonquin Road, Arlington Heights, Ill. 60005.

'Drawmol' Targets Chemists

HAYWARD, Calif. — Molecular Design Ltd. has introduced software that enables chemists to draw molecular structures for use in modeling and analysis.

Drawmol reportedly allows the user to draw any molecule containing up to 256 atoms on a graphics terminal screen.

The software is available for use on Prime Computer, Inc. 50 Series, Digital Equipment Corp. VAX-11 and DEC-10 and DEC-20 computers, the vendor said. The package costs $9,500 and further information is available from Molecular Design Ltd., 1122 B St., Hayward, Calif. 94541.

Analysis System Introduced

NASHVILLE, Tenn. — S&H Computer Systems, Inc. has introduced a data analysis software system for users of Digital Equipment Corp. VAX/VMS computers.

The Integrated Data Analysis System reportedly provides data base facilities, including the ability to sort, merge, update and join data bases; a complete programming language; a matrix manipulation language; and statistical analysis procedures including the General Linear Model.

This product is expected to be released Jan. 1 for approximately $6,000 for commercial use and $3,000 for educational establishments. S&H is based at 1027 17th Ave. S., Nashville, Tenn. 37212.

'Qsort' Version Fits DEC Minis

LATHRUP VILLAGE, Mich. — Advanced Software Products, Inc. has announced Version 3.0 of Qsort, its sort utility said to use the operating system's capabilities to sort large quantities of data and merge unsorted files.

Developed for use on Digital Equipment Corp. PDP-11 minicomputers using CTS-500/RSTS-E operating systems, Qsort allows the programmer to describe the sort with a single command line instead of having to build, translate and compile a sort file, the vendor claimed.

Qsort Version 3.0 will be available Oct. 1 for $1,200 from Advanced Software Products, Suite 291, 28690 Southfield Road, Lathrup Village, Mich. 48076.

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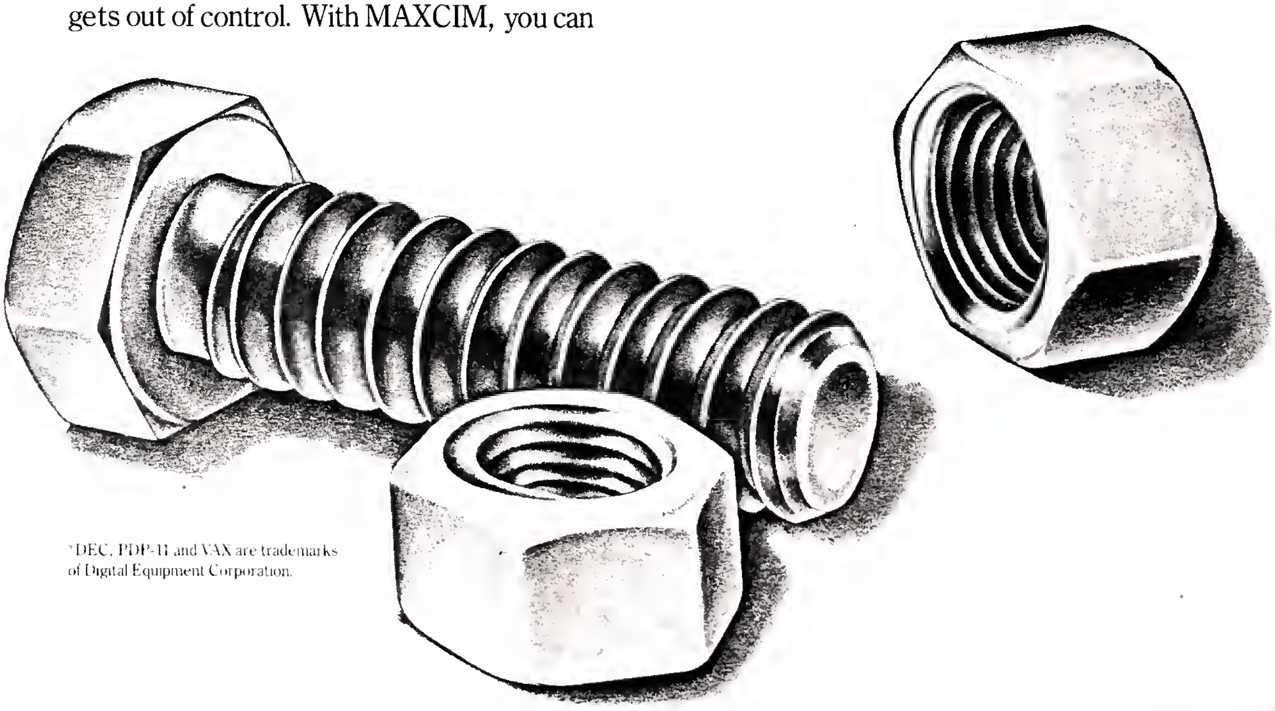

*DEC, PDP-11 and VAX are trademarks of Digital Equipment Corporation.

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VAX-11 Users Get Graphics

BURLINGTON, Mass.. — Interactive Systems, Inc. has announced a business graphics package for users of Digital Equipment Corp. VAX-11 processors.

Called D-Pict/B, the package uses an interactive menu approach to allow the user to produce bar charts, pie charts and line charts in as few as two instructions. Once a chart definition has been created, it can be recalled later for use with new data, the vendor said.

The package costs $8,000, the vendor said from 131 Middlesex Tnpk., Burlington, Mass. 01803.

'Datamate' Fits NCR Systems

CINCINNATI — The Software Clearing House has announced Datamate, a data retrieval report generator for users of NCR Corp. systems running under IMOS, IRX and VRX operating systems.

Features include the ability to read programs automatically and set up a dictionary from a Cobol file description and offer reusable reports on a menu-format basis, the vendor said.

The package costs $4,000 for the IMOS operating system, $5,000 for the IRX operating system and $7,500 for a VRX version, the vendor said from 771 Neeb Road, Cincinnati, Ohio, 45238.

Tool Aids Law Firms Using HP 3000 Units

SALEM, Ore. — Data Information Science Center, Inc. has announced a time and expense reporting and billing system for law firms using Hewlett-Packard Co. HP 3000 processors.

Lawyer Time Billing (LTB)/3000 is designed to handle time and expense reporting on a daily basis for a law firm of any size. Features include daily time and expense proofs, accounts receivable and delinquent reporting, work-in-process, billing memorandums and flexible statement preparation.

The software costs $25,000. The vendor can be reached through P.O. Box 3185, Salem, Ore. 97302.

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PERKIN-ELMER

Salary Administration Tool Operates on System/34, 38

FRAMINGHAM, Mass. — Payking, a proprietary salary administration software package said to encompass all aspects of compensation and compensation planning has been announced by Alpha Systems, Inc.

Payking supports multicompany processing as well as responsibility-area reporting, the vendor said. The package is now in RPG for the IBM System/34 and 38 and will be available in the first quarter of 1983 in structured ANS Cobol for IBM-compatible systems.

The package helps organizations solve the three major salary administration issues — pay equitability, competitive pay standards and compliance with current legislation — while promising ease of use because of its modularity, the company claimed.

The modules, available separately, include point-factor analysis, survey support/structure development and merit budget allocation/system monitor.

Payking is priced between $11,000 and $13,500 depending on system requirements from Alpha Systems, 1329 Old Worcester Road, Framingham, Mass. 01701.

Text Formatter Out for Series/1

ANN ARBOR, Mich. — A text formatting system for the IBM Series/1 computer has been introduced here by Computerized Office Services, Inc.

Textstream/1 was designed to handle manuals, books, proposals, contracts, form letters, mailing lists, reports, technical reports with equations, price lists, product brochures and memos, according to the vendor. It features user-definable macros with arguments, interactive capabilities, printer graphics, user-creatable characters, work-string substitution, multiple fonts, subscripts and superscripts. It formats text for printing on the Xerox Corp. 9700 laser printer, line printers and letter-quality printers.

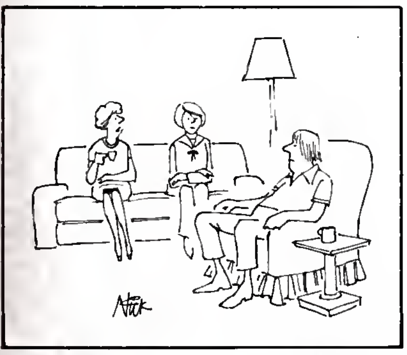
This product costs $2,950, the vendor said from 309 N. First St., Ann Arbor, Mich. 48103.

Testing Aided On IBM CPUs

FALLS CHURCH, Va. — A generalized parameter card-driven utility generator that produces test data in IBM 370, 4300 and 3000 series environments has been unveiled here by Tech Products, Inc.

Tech Products Utility Generator's (Tug) commands reportedly enable the user to define the output in a flexible manner and then write specific data to an output file.

Tug is available for $6,000. The vendor is located at 7700 Leesburg Pike, Falls Church, Va. 22043.



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Ledger Package Fits System/38

MILWAUKEE, Wis. — Harris Data Service, Inc. has announced a general ledger package for IBM System/38 processors.

Highlights of the package include a 14-digit account number, multicompany/facility reporting, comprehensive inquiry functions, user-defined statement formatting, flexible consolidation and user-defined ratio reporting, the vendor said.

The package costs $5,000 for a perpetual license including all source code, demo files, installation procedures and documentation, the vendor said from 11629 W. Dearbourn Ave., Milwaukee, Wis. 53226.

'Scon' Gains Routing Feature

PITTSBURGH, Pa. — The capability of selective routing of console messages to one or more local or remote TSO terminals has been added in Release 1.4 of Duquesne Systems, Inc.'s Superconsole (Scon).

Scon, which reportedly operates on any IBM MVS system, also allows any authorized terminal to enter commands and receive replies from any system. This feature reportedly makes the product a powerful tool for systems programmers for diagnosing and correcting system problems remotely in a complex and from a single terminal.

Scon 1.4 costs $7,000 for two CPUs, and $10,000 for unlimited CPUs, according to the vendor at Two Allegheny Center, Pittsburgh, Pa. 15212.

Sunmark Offers Distribution Package

ST. LOUIS — Sunmark, Inc. has assumed national sales and marketing responsibilities for The Distribution Solution, on-line real-time distribution management software for IBM 4300 users.

The package reportedly includes the Information Management Software Specialists order management system combined with enhancements by Sunmark to provide order processing, inventory control, shipment consolidation, price application and promotion monitoring.

The package costs between $59,000 and $97,000, depending on the number of modules ordered, Sunmark said from 10795 Watson Road, St. Louis, Mo. 63127.

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VMBACKUP Highlights:
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VMTAPE SM

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VMTAPE Highlights:
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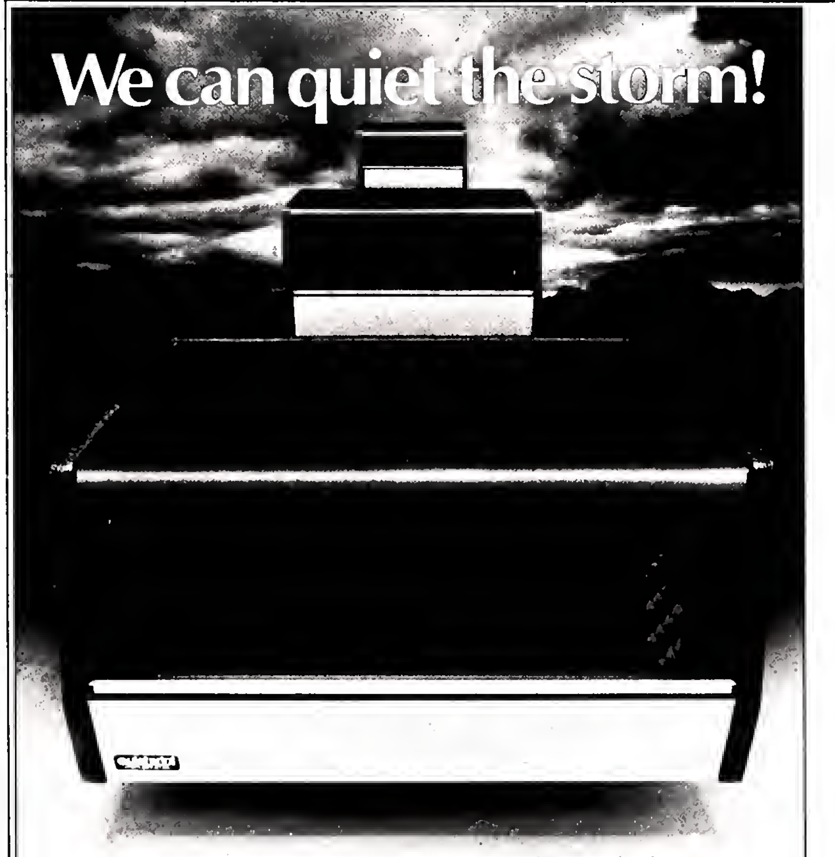

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Tool Unveiled For System/34

FORT MYERS, Fla. — Medical Engineering, Inc. has announced a comprehensive Inventory Management System (IMS) for IBM System/34 users in the health care industry.

The system maintains a perpetual inventory of all items that are stocked in inventory and keeps records on the status of each item from order to final receipt and issue.

Features include purchase order generation, receipts and returns, requisitions and issues, physical inventory updating, automatic stock pricing, statistical analysis, general ledger interface and on-line inquiries.

The package costs $20,500 from Medical Engineering, Suite 108, 2675 Winkler Ave., Fort Myers, Fla. 33901.

Infonet Users Get Mail Service

EL SEGUNDO, Calif. — Computer Sciences Corp. has introduced an electronic mail service for customers of its Infonet remote computing network.

A key feature of the service, called Notice, allows users to create messages that draw on reports and other information stored in customer files and data bases, according to the vendor. All of Infonet's DP tools are available through Notice, including the word processing capability of its IS50 microcomputer workstation.

New users can be added to Notice at a $1,000 charge, and pricing is based on the resources used. The vendor is based at 650 N. Sepulveda Blvd., El Segundo, Calif. 90245.

Cuts I/O, Ups Speed

Version 3.1G1 of DRS Out

KINGSTON, N.J. — Advanced Data Management, Inc. has announced Version 3.1G1 of its DRS data base management system said to reduce I/O activity and increase speed and efficiency in operations.

The release runs on Digital Equipment Corp. VAX-11 systems under VMS 3.0, as does DRS Version 3.0. It includes a new user function argument that allows a user-written program to be called as an extension to the Select and Define commands and a query command that obtains key field names, sort lengths and link field names for an index and displays the information at the terminal or at the printer, the vendor said.

A call command allows a user-written program to be called from a specification, while the use of pooled buffers allows multiuser applications to access a single buffer pool for data base files, reducing I/O activity, the company said.

DRS is priced from $20,000 to $30,000, depending on hardware, from Advanced Data Management, P O. Box 601, 17-15 Main St., Kingston, N.J. 08528.

Rims/MPG Gets DBL Version

CORAOPOLIS, Pa. — Information and Systems Research, Inc. has announced a DBL language version of its Requestor-Oriented Information Management System/Mechanized Program Generator (Rims/MPG) application program generating system for Digital Equipment Corp. systems running under RSX-11M.

The package was designed to allow organizations currently using the RSX-11M operating system for nonbusiness applications generally written in Fortran also to utilize the same computer for business-related applications.

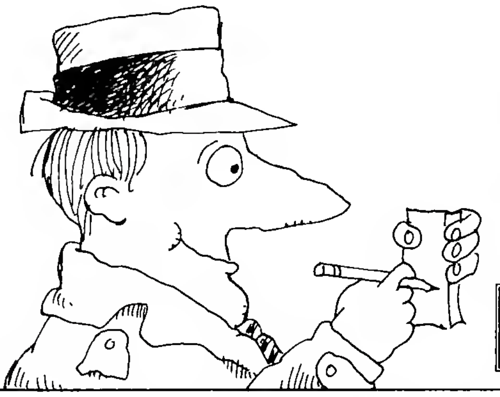
The license fee for the current version costs $7,500 from the firm at Building One, Airport Office Park, 410 Rouser Road, Coraopolis, Pa. 15108.

'CPS-1' Aids UCC T/S Users

DALLAS — University Computing Co. has unveiled a general-purpose contouring program available to its time-sharing clients that was designed to analyze surfaces beyond normal plotting.

CPS-1 (Contour Plotting Software) was designed to operate on and produce graphics displays of three-dimensional surfaces with an emphasis on contour plots from gridded or irregularly spaced data points. The program reportedly is capable of handling multiple surfaces and a virtually unlimited amount of data. Other CPS-1 features include trend and residual analysis, inferring second horizons and smoothing and filtering geophysical data, the vendor said.

Pricing is done on a transaction basis, and the firm is based at UCC Tower, Exchange Park, Dallas, Texas 75235.



COVERING THE DATABASES

Computerworld's October 25th Special Report Gives You All You Need to Make the Right DBMS Choices.

According to International Data Corporation, the world's largest independent computer industry research firm, the Data Management marketplace, which was three million dollars in 1981, will grow to one billion five hundred twenty million by 1986.

The data base management systems segment of that marketplace is not only the largest segment — it's the fastest-growing. This rapid growth is due to the increasing interest in decision support systems and the integration of application software with DBMS.

When *Computerworld* covers this high-growth industry sector in its October 25th Special Report on DBMS, you'll get tutorials by industry specialists on DBMS topics. And you'll get application stories that will outline how and why companies selected DBMS, what products they considered and finally chose, and details on how the software worked after it was installed. And you'll get articles on:

- Trends in user interfaces to DBMS
- The evolution of data base technology (emphasizing current trends)
- DBMS in the Micro World: Are workable products available?
- How to select the right DBMS for your needs
- DBMS Models: An Explanation
- Managing the DBMS: Special problems and concerns
- The role of the data base administrator
- Trends in data base machines: Why should these be selected over DBMS packages?

If you are considering DBMS systems, this is the Special Report you won't want to miss.

And if you sell utility software packages, data management systems or data base management systems, here's where you'll find your customers next October 25th — reading *Computerworld's* Special Report on Data Base Management Systems. Your ad in this issue will assure them more complete information on the products in the field. Ad close for this Special Report is October 8th.

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Maintenance Utility Unit Out for HP 'Image' Users

BUFFALO, N.Y. — Bradmark Computer Systems, Inc. has announced a maintenance utility system for users of Hewlett-Packard Co.'s Image data base management system on the HP 3000.

Data Basics is said to combine four data base utilities into one system. DBCopy II reportedly lets the user copy an entire data base, selected data sets or selected items within an entry. DBIsam is said to allow both Image and Ksam-like access to the same set of files, supporting up to 10 indices/data set.

DB-Key-Change assists the user in performing "key change" operations and Base Builder reportedly helps the user put together sample or test data bases from an existing production data base by identifying items within the key data set.

The package costs $4,750 from the firm at 4446 Main St., Buffalo, N.Y. 14226.

'Udraw' System Gets Enhanced

STAMFORD, Conn. — Sparacino Associates, Inc. has announced an enhancement to its Udraw business and technical graphics software system for the Hewlett-Packard Co. HP 9845B/C desktop computer, as well as two utilities for the system.

The enhancement means that the HP 9111A Graphics Tablet is no longer mandatory in order to utilize the system, the vendor said. Three primary user-interface options are now provided: the HP 9845 keyboard, the HP 9845 Light Pen and the HP 9111A Graphics Tablet.

The XY Chart Udraw Utility enables the preparation of XY charts. The Plot Udraw Utility provides the same plotting capability available in Udraw plus an additional font for text and reportedly provides independent off-line plotting capability.

Udraw costs $1,000, XY Chart Udraw costs $500 and Plot Udraw costs $250 from the firm at 175 Blackberry Drive, Stamford, Conn. 06903.

Kit Aids Banks With IBM CICS

INDIANAPOLIS — Anacomp, Inc. has announced Bankserv, a collection management package for banks using IBM mainframes.

The package manages collection of credit card loans, retailer charge accounts, finance company consumer loans and virtually any private-label credit card plan with a significant number of accounts, the vendor said.

The package is written in Cobol and is designed for IBM systems with CICS. The package is parameter driven by the lending institution or individual application and costs $95,000. The vendor can be reached at P.O. Box 40888, Indianapolis, Ind. 46240.

IS IT NORMAL TO HAVE 'HANDS-ON' TRAINING IN THE DARK?

Burroughs Users Gain Support

ATLANTA — Cumberland Software, Inc. is offering support for a number of software packages on Burroughs Corp. systems.

These include the Mortgage Information and Servicing System on the Models B90, B800, B900, B1800, B1900 and B2900 computers and Programmed Closing Systems on Burroughs' L8000 and L9000.

To comply with the new truth-in-lending requirements a user might need, the vendor will provide programming and forms changes and will further contract for future system enhancements to existing equipment, the vendor said.

Prices of the support services are based on individual user needs from Cumberland Software, Suite 210, P.O. Box 724568, 2555 Cumberland Pkwy., Atlanta, Ga. 30339.

Preprocessor For SPSS Out

BOSTON — An interactive preprocessor for the SPSS, Inc. SPSS statistical analysis package has been announced here by Surestats.

Surestats, also the name of the product, provides a method for preparing and editing SPSS statistical job runs, generates error-free job control syntax and performs data filtering and editing of erroneous data before the job is submitted, according to the vendor.

This product has been operational on a national time-sharing service bureau for two years and can reportedly now be used on Digital Equipment Corp.'s DEC System-10 or 20.

The initial license fee for Surestats is $3,000. The vendor can be reached through P.O. Box 1366, 390 Stuart St., Boston, Mass. 02117.

Data File Utility Out for System/34

SAN FRANCISCO — An on-line and interactive data file utility said to define data files, generate code and compile maintenance programs for the IBM System/34 has been announced by The Orion Group, Inc.

Local Multifile Utility (LMU) allows the programmer to examine the contents of a file while it displays and updates file data in both character and hexadecimal formats. The utility also allows for the scanning of previously generated file maintenance programs, the vendor said.

LMU is priced at $175, including source code, from The Orion Group, 44 Montgomery St., San Francisco, Calif. 94104.

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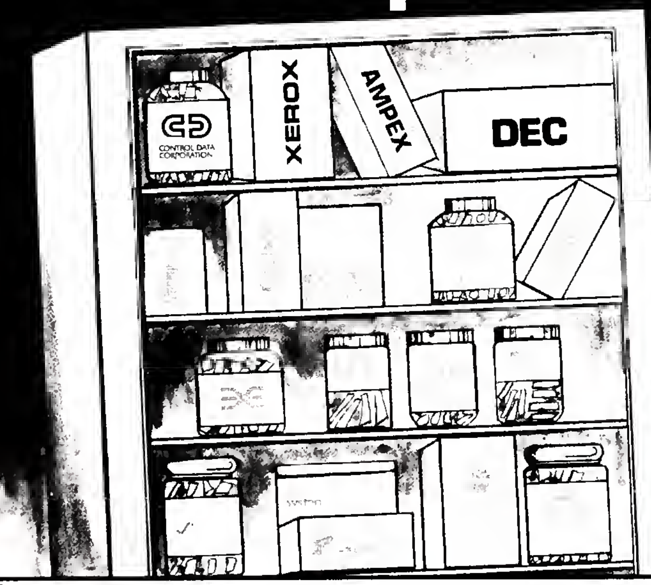

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TI's 'RTS' Now Available On Its Systems Under Dnos

AUSTIN, Texas — Texas Instruments, Inc.'s Remote Terminal Subsystem (RTS) communications software is now available on TI computer systems using the Distributed Network Operating Systems (Dnos).

RTS software reportedly allows interactive communication between remote TI terminals and a TI computer over leased or switched telephone lines.

Under Dnos, the remote RTS user can take advantage of other communications products such as the TI Distributed Networking Communications Systems, the vendor said.

The Dnos RTS software license costs $1,100. The vendor can be reached through P.O. Box 202146, Attn: H-629, Dallas, Texas 75220.

Enhancement to Mapics

Inventory Control Package Bows

WARWICK, R.I. — Daly & Wolcott, Inc. has announced an inventory control package designed to enable managers to increase coordination between raw material supplies and manufacturing requirements.

The Material Availability and Shortage System release is an enhancement package for users of IBM System/34 Manufacturing Accounting and Production Information Control System (Mapics) software who also use IBM's Product Data Management and Inventory Management, according to the company.

The company said that the new package allows manufacturing managers to enter forecasts of their finished goods item numbers, quantities needed and dates to begin manufacturing. The package will analyze different bills of materials and summarize like items at the raw material level.

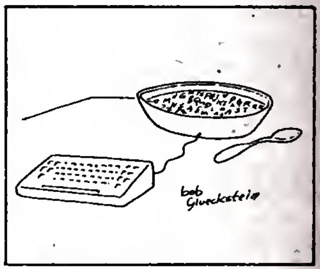
The package comes with both source and object code. It is available Oct. 1 for $500 from Daly & Wolcott, 120 Lavan St., Warwick, R.I. 02888.

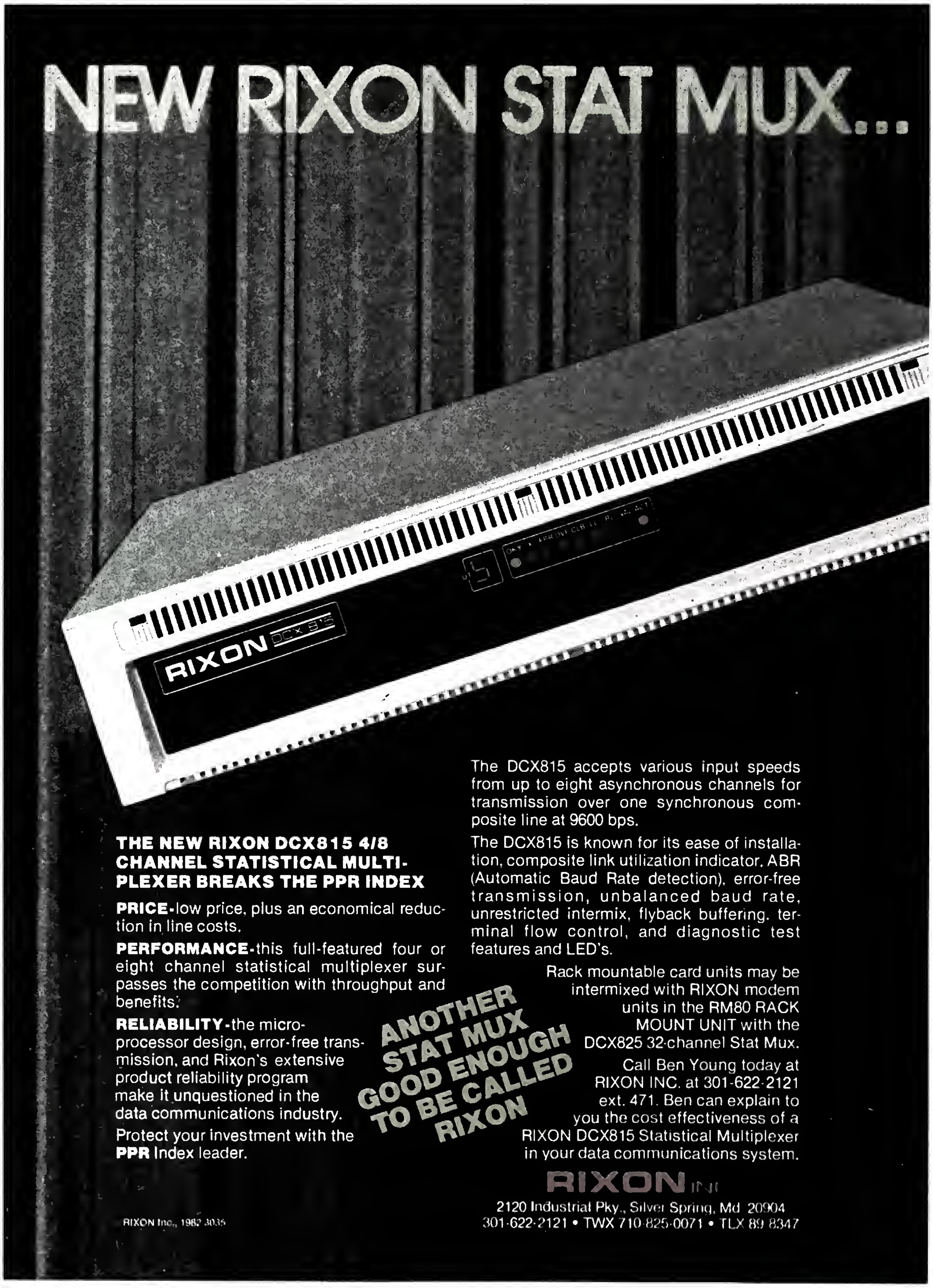
'C Executive' Gets Pascal

ROSLYN, Pa. — JMI Software Consultants, Inc. has added Pascal support to the previously announced C Executive, its execute-only memory-resident monitor for programs written in the C language.

The C Executive was designed for users who wish to run multiple C and/or Pascal programs in a minimum hardware configuration where disk subsystems are not appropriate, the vendor explained. It allows multiple tasks to run concurrently with intertask communication, resource coordination and formatted input/output.

Versions of this product are available for Digital Equipment Corp.'s LSI-11; Motorola, Inc.'s MC68000; Intel Corp.'s 8080/8085; and Zilog, Inc.'s Z80. The single unit price is $300, the vendor said from 1422 Easton Road, Roslyn, Pa. 19001.





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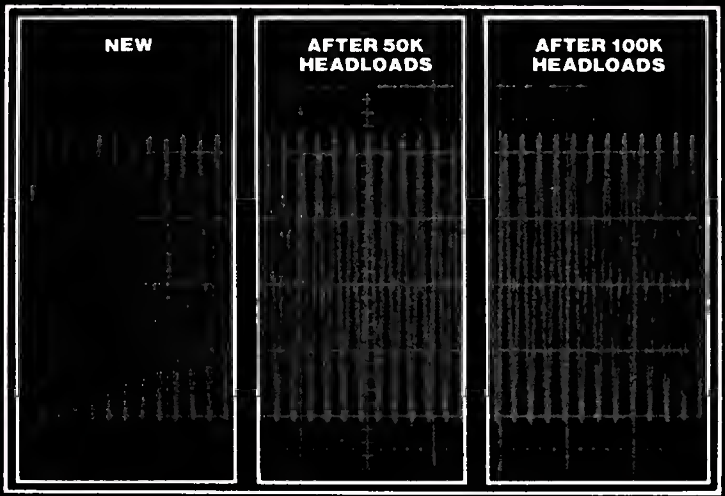

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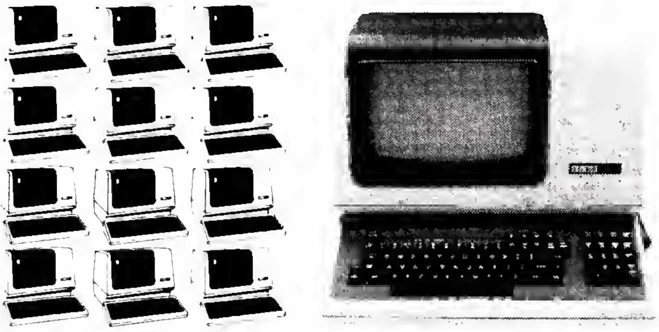

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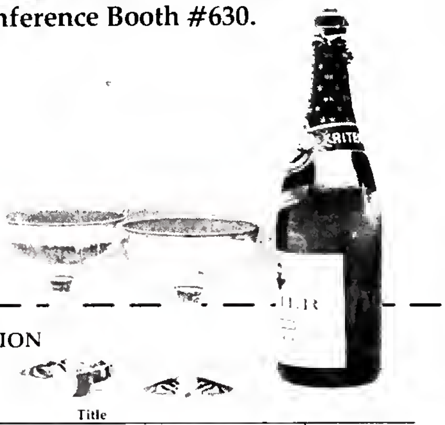

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Micro Notes

Advanced Micro Techniques has announced **MicroTLX**, a software package that reportedly offers telex capabilities to any business using the Digital Research, Inc. CP/M operating system. With MicroTLX, users can send and receive telex and TWX messages; send Mailgrams, telegrams and overseas cables; and have immediate access to news, weather, stock, bond and commodities prices, the vendor said. The package costs $150 from Advanced Micro Techniques, Suite 209, 1291 E. Hillsdale Blvd., Foster City, Calif. 94404.

Context Management Systems, Inc. has announced the **Context MBA**, a program that reportedly incorporates electronic spreadsheet, word processing, graphics and data base functions in one integrated program. Data entered into one mode can be used in any of the other modes without reentry, the company said. MBA runs on the IBM Personal Computer and requires 256K bytes of memory, dual disk drives and the IBM color graphics card. The $695 price includes a telecommunications function from Context Management Systems, Suite 100, 23864 Hawthorne Blvd., Torrance, Calif. 91604.

Computer Station has announced the **Combined Graphic Writer**, a software package that reportedly offers expanded printing features and character sets to users of the Apple Computer, Inc. Apple II computer. Combined Graphic Writer is supplied with 21 character sets that may be changed anywhere within the line as desired, the company reported. The package supports 13 printers and 12 interface cards and may be used to print with various fonts in conjunction with Applewriter 1.1, Magic Window, Screenwriter II or any sequential text file. The system is available for $54.95 from Computer Station, 11610 Page Service Drive, St. Louis, Mo. 63141.

Ultracalc, an electronic spreadsheet program for 8- and 16-bit systems running in a Digital Research, Inc. CP/M, Microsoft, Inc. MSDOS or Bell Laboratories' Unix environment has been announced by Lattice, Inc. The system's algebraic expression analyzer supports 11 operators and 22 functions. The system employs a menu-driven format and includes an extensive set of prompts, on-line help and error messages. Ultracalc is written in C and can be converted to run on any computer that supports the C language, the company reported. Ultracalc costs $195 from Lattice, P.O. Box 648, Hoffman Estates, Ill. 60195.

Software said to enable owners of personal computers and small business systems to use ITT Databridge services for sending, storing and receiving telex messages is available from Xyzzy Corp. **TLX-A-SYST** — available for most Digital Research, Inc. CP/M and MP/M systems and for the IBM Personal Computer — costs $250 with a 10% discount for cash orders from P.O. Box 9002-116, Boulder, Colo. 80301.

International Software Enterprises-USA, Inc., an operating company of Micro Data Base Systems, Inc. (MDBS), has announced interfaces to its MDBS III data base management system for two hardware environments: Intel Corp. 8080 and 8085 under Digital Research, Inc. CP/M and MP/M operating systems. The CP/M interfaces are available for eight languages, and the MP/M interfaces are available for 10 languages. MDBS III with interface costs between $2,000 and $30,000, a spokesman said from 350 W. Sagamore Pkwy., West Lafayette, Ind. 47906.

Softlink Corp. has announced that three of its Demo/Preview programs are now available for the IBM Personal Computer. For $49.95, the user can test the program before paying the balance of $245 for **Supercalc** and **Spellguard** and $450 for **Office Integrator** (the enhanced Spellbinder). Softlink is located at Suite A, 3255-2 Scott Blvd., Santa Clara, Calif. 95051.

Peachtree Software, Inc. has announced a business graphics system built on its Peachtree Graphics Language (PGL). The **PGL Business Graphics System** is said to allow definition of bar graphs, line graphs, pie charts and word charts. The software reportedly supports all devices available with PGL and costs $475 from the vendor at 3445 Peachtree Road N.E., 8th Floor, Atlanta, Ga. 30326.

Starware, Inc. has announced Version 1.0 of The **Draftsman**, a general graphics program for the IBM Personal Computer. The user-friendly Draftsman reportedly allows images to be printed on the IBM or Epson America, Inc. MX-80 printer. The software costs $200 from the firm at 1701 K St. N.W., Washington, D.C. 20006.

Version 3.0 of **Secure**, a software program developed by Century Systems, Inc. designed to stop unauthorized access to files, has been announced. This product uses two user-supplied keys to safeguard files on any Zilog, Inc. Z80-based microcomputers using Digital Research, Inc. CP/M 2.0 or later. It costs $150, the vendor said from Suite 11B, 12872 Valley View Ave., Garden Grove, Calif. 92645.

Radio Shack Model II users can now exchange data files and source programs with Digital Research, Inc. CP/M or Digital Equipment Corp. RT11-based systems with the **Reformatter** conversion software product from Microtech Exports, Inc. This product costs $249, Microtech said from Suite 2, 467 Hamilton Ave., Palo Alto, Calif. 94301.

Savvy Marketing International has announced the release of its **Savvy Personal Language System** for users of Apple Computers, Inc. Apple II microcomputers. This package includes general ledger, accounts receivable, accounts payable, payroll, mailing list, document writer and inventory control. It costs $950; Savvy is based at 100 S. Ellsworth St., Ninth Floor, San Mateo, Calif. 94401.

Combined Graphic Writer is a new software offering from Computer Station, Inc. for users of Apple Computers, Inc. microcomputers. It features custom printing, with underline, boldface and inverse typeface and costs $54.95. Computer Station is located at 11610 Page Service Drive, St. Louis, Mo. 63141.

Prime Factors has released **Psypher**, a Digital Research, Inc. CP/M-based file encrypter for confidential information. It is recommended for payroll protection, data base security, general ledger and any other sensitive information and costs $79.95 from Prime Factors at 6529 Telegraph Ave., Oakland, Calif. 94609.

Ellis Computing Co. has announced **Nevada Fortran** for Digital Research, Inc.'s CP/M-based microcomputers. Nevada Fortran is both a subset and a superset of Ansi 1966 Fortran and was designed specifically for microcomputers, the company said. The compiler generates Intel Corp. 8080 microprocessor machine language on all CP/M-based systems with at least 32K bytes of random-access memory. Priced at $199.95, Nevada Fortran documentation and diskette is available from Ellis Computing, 600 41st Ave., San Francisco, Calif. 94121.

From PC/Software, Inc. comes a software package said to greatly expand the capabilities of IBM's Personal Computer, allowing up to eight people to simultaneously use one computer while engaged in up to 250 tasking functions. The **Quinx** operating systems features a full-screen text editor and a text formatter, the company claimed. Quinx is priced from $350 to $950 from PC/Software, Inc., 926 Natoma St., San Francisco, Calif. 94103.

Sunbelt Computer Systems, Inc. has unleashed its Digital Research, Inc. CP/M-compatible implementation of the databus programming language, originally developed by Datapoint Corp. for business system programming. **Sund B80** includes most of the features of Datapoint's latest Databus release, except those that are hardware dependent in the microcomputer environment, the company said. Sund B80 will run with most available terminals, and programs can be moved from system to system and terminal to terminal without recompilation or individual reconfiguration of individual programs, the company said. Sund B80 is priced at $995 from Sunbelt Computer Systems, Inc., 2455 E. 51st St., Tulsa, Okla. 74105.

Softrends, Inc. is offering a release of **Brevit**, a package designed to provide users of Apparat, Inc.'s Newdos/80 Version 2 with the ability to create and use abbreviations for Apparat's DOS and Basic command sequences. The program can be used for simple, multipositional, multiparameter or conditional abbreviations. The number of abbreviations is limited only by available disk space, the vendor said. Brevit is priced at $19.95 from Softrends, Inc., 26111 Brush Ave., Euclid, Ohio 44132.

Candle's Performance Seminars
MVS IMS CICS

San Jose Oct. 28–29 **New York City** Nov. 4–5
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Candle Corporation,® the developer of OMEGAMON,® is presenting a comprehensive set of two-day technical seminars on performance analysis and tuning for MVS, IMS, and CICS. The presentations are designed for intermediate or advanced level systems programmers and technically oriented managers. Sessions cover introductory concepts and work into detailed analysis of performance problems.

Day 1

8:30–9:00 A.M. Registration
9:00–10:45 A.M.

G01: GENERAL SESSION
- **Introduction to Candle's Products and Performance Tuning Methodologies for MVS, IMS, and CICS.**
  - Resource and Workload Orientations
  - Interactive Products
  - Background Products
- **Degradation Analysis**
  - Focus on the Effect of Various Resources on the Workload
  - Case History Studies from the Output of OMEGAMON and DEXAN
  - Overview of Implementation in MVS, IMS, and CICS

11:15–12:15 P.M.

G02: IBM FUTURES
- IBM's Direction as it Impacts Users
- Effects on Performance Analysis and Tuning
- The Evolution of MVS, VM, IMS, and CICS

MVS

1:30–4:45 P.M.

M01: SRM ANALYSIS AND TUNING
- SRM Functions
- Workload Adjustment Through Swapping
- Dispatching Priority Control
- Logical Swapping
- Adjusting SRM Parameters
- Setting Up an IPS
- Setting Up an ICS
- Monitoring the SRM Using RMF, OMEGAMON, DEXAN, and EPILOG

IMS

1:30–4:45 P.M.

I01: IMS INTERNALS
- **IMS Architecture**
  - Overview
  - The Performance Analyst's Viewpoint
- **OMEGAMON/IMS and DEXAN/IMS**
  - Overview
  - Product Structure, Features and Uses
- **The IMS Scheduling Process**
  - Analyzing the Process
  - Overcoming Bottlenecks
- **The IMS Dispatcher**
  - Detailed Discussion of IMS Dispatcher
  - Common Causes of Delayed Transaction Flows

CICS

1:30–4:45 P.M.

C01: CICS INTERNALS
- **CICS Task Control Internals and Performance**
  - Overview, the "Hub" of CICS
  - Task Control Dispatcher Functions
  - Task Control as a Macro Servicer
- **CICS Transaction Flow**
  - Detailed Creation of a CICS Task and Interaction of CICS Management Modules
  - Task Control Blocks, Functions, Relationships, and Differences Between CICS Releases
- **CICS Task Dispatcher Internals and Performance**
  - An Indepth Look
  - Task Related Performance Parameters and Recommendations

Day 2

9:00–12:15 P.M.

M02: I/O CONFIGURATION ANALYSIS AND TUNING
- Detailed Analysis of How MVS Performs I/Os
- Optimizing I/O Configurations for Performance
- Effects of Path Busy and Device Busy
- Channel Selection Algorithms
- Performance Comparisons of 3350, 3380, and Solid State Devices
- Impact of the Recently Announced Cache Devices
- Analyzing the Impact of MVS/XA

9:00–12:15 P.M.

C02: CICS PERFORMANCE TIPS AND HINTS
- Establishing Performance Objectives
- A Practical Approach to CICS Performance
- Performance Methodology and Detailed Solutions

1:30–4:45 P.M.

M03: PAGING/SWAPPING
- ASM Algorithms
- Extended Swap
- How to Configure the I/O Subsystem for Paging/Swapping
- Storage Isolation
- Benefits of Isolated Paging Devices
- Performance Comparisons of Various Types of Paging Devices
- How to Measure the Impact of Paging/Swapping

1:30–4:45 P.M.

I02: IMS TUNING PERSPECTIVE
- **IMS Pools**
  - Overview
  - Effects on Performance
- **MVS Factors that Influence IMS Performance**
  - Real Storage
  - Paging Performance and Dispatching Priorities
  - Performance Oriented Options (VTAM, Authorized Path, etc.)
- **Responding to Problems**

1:30–4:45 P.M.

C03: CICS VSAM PERFORMANCE AND CICS STORAGE ANALYSIS
- **File Control Functions**
- **VSAM Performance and Effects on CICS**
  - VSAM Optimization under CICS
  - VSAM Local Shared Resources
- **CICS Storage Control**
  - Storage Control Functions
  - A Close Look at the Dynamic Storage Area (DSA)
  - OSCOR Analysis
  - Storage Recovery and Stall Processing

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Vtep-1, Pdvr-33, AUD-F

HP 1000 Users Get Three Utilities

ABERDEEN, N.J. — Corporate Computer Services has announced three utility packages for users of the Hewlett-Packard Co. HP 1000.

Vtep-1 is a virtual terminal emulation package and is a combination of company software, standard HP software and special company connector cables that reportedly permit the 1000 to interface any other computer if the latter supports a dumb, character-mode, asynchronous terminal.

Pdvr-33 is a pseudo disk driver that permits the user to designate a portion of the computer's memory space to simulate a small disk drive. The amount of memory in the pseudo disk can be changed as needed to handle programs of various sizes.

AUD-F is a program to audit Fortran programs while they are being tested and it permits the user to get reports on which lines have or have not been tested, the company claimed.

Vtep-1 is priced at $2,500, Pdvr-33 at $1,800 and AUD-F at $995 from Corporate Computer Systems, Inc., 675 Line Road, Aberdeen, N.J. 07747.

Xerox Cuts Praxa Price

LOS ANGELES — A reduction in the price of a complete Praxa software system for the Digital Equipment Corp. PDP-11 and VAX-11 systems has been announced by Xerox Computer Services.

Installation charges for Praxa financial, manufacturing and distribution software have been reduced 34%. In addition, a standard price has been established for file maintenance software for various computer models.

New discount structures for multiple applications are also in effect. A 10% discount may be applied when five to eight applications are licensed or a 20% discount can be applied for nine or more.

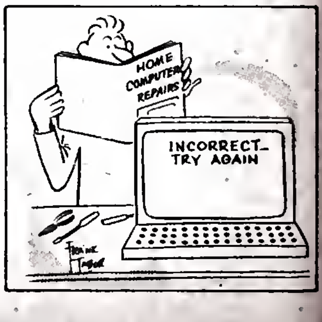
A schedule of price reductions is available from Janet Wharton, Xerox Computer Services, 5310 Beethoven St., Los Angeles, Calif. 90066.

'Spreadsheet' Aids TI 990

PLANO, Texas — Innovative Data Resources, Inc. has announced Spreadsheet, a software package offering electronic spreadsheet capabilities to users of Texas Instruments, Inc. 990 computer products.

Spreadsheet may be used for forecasting, business modeling, pro forma profit and loss statements, cash flow projections, "what if" analysis and job costing, according to the company. The package employs a menu-driven format and an on-line HELP feature.

Spreadsheet costs $750 with volume discounts available. A 30-day trial package is also available for $75 from Innovative Data Resources at Suite 201, 1309 W. 15th St., Plano, Texas 75075.



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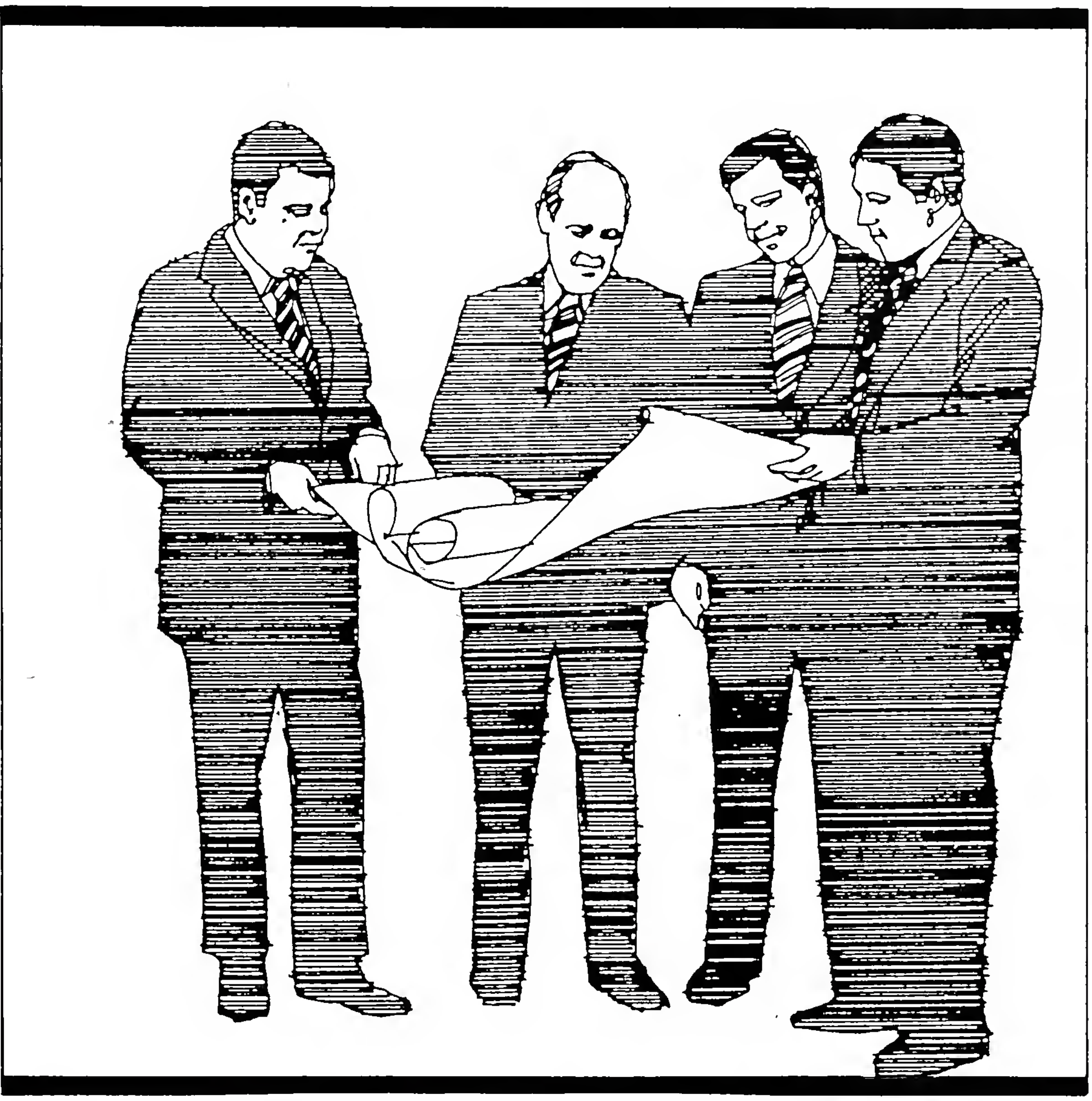
SPECIAL**REPORT**

Unraveling the Complexities Of Data Communications Networks



Edited by Bruce Hoard and Jim Bartimo

Sept. 27, 1982

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Effect on Basic Services?

Managers Must Plan for AT&T Deregulation

By K.J. Jankowsi
Special to CW

Now that AT&T has been restructured, the focus of attention for data communications managers is how basic service rates will be affected. The operating company responsible for providing local loop facilities will most likely escalate service costs to the end user anywhere from 10% to 30%. Have you budgeted for this?

Here are a few of the areas that you must assess and reevaluate prior to 1983:

- *Organizational Issues.* The AT&T support team will remain in full effect. But its leadership, management control and authority over the local telephone company (now the Bell operating company) disappears. As AT&T begins to strengthen its fully separate subsidiary with top marketing and technical people, the operating companies will find it difficult to hold on to key personnel. Clearly, the career challenge and opportunity is with AT&T and the separate subsidiary. Expect the operating company account teams to be in disarray as divestiture proceeds.

The data communications manager may experience some difficult times as the operating companies and AT&T "test" their newly defined business relationships. The operating companies will have organizational growth pains as they become independent.

- *Financial Issues.* The current means and methods for establishing rate bases is extremely complex and poorly executed in the present environment. The Federal Communications Commission (FCC) and Public Utility Commissions (PUC) are the controlling authorities in this area. A critical component of the divestiture program is the embedded equipment base, which is primarily private branch exchange (PBX) equipment and wiring. The operating companies lose this installed base of equipment, after an interim period, as an expense.

This in turn affects how much the operating company charges you for service, relative to the allowable rate of return on their investments set by the PUC. The net effect will be to decrease gross revenues to the operating companies. With the loss of subsidization from AT&T, it is unclear how financially stable the operating companies will be.

> *'The focus of attention for the data communications manager is how basic service rates will be affected. The operating company responsible for providing local loop facilities will most likely escalate service costs to the end user anywhere from 10% to 30%. Have you budgeted for this?'*

Digital electronics has united the two kingdoms of voice and data. The supercontroller, capable of switching voice and data signals, is a new network component that must be assimilated into local-area, domestic and global telecommunications networks. Managing the supercontroller will be important, but whose responsibility is it? And what about "enhanced services"?

An Evolved PBX

The supercontroller is not like a modem; it's not like a front-end processor; it's not like a terminal; it's not like a concentrator. It is an extremely sophisticated, computerized switch requiring extremely technical engineering skills to configure properly. Since voice signals are passed through this device, it has significantly different problems and concerns. The supercontroller being an evolved PBX, few, if any, data communications people will be able to cope with all its intricacies quickly. As voice management personnel know, selecting and operating a PBX is often a career decision.

"Enhanced Services" as defined by the Computer Inquiry II will rapidly become an important network resource. The implementation of AT&T's Advanced Information Systems/Net 1000 Service will have a major impact on teleprocessing management strategies.

Corporate Factors

As two kingdoms come together (voice and data), the territorial egos of both organizations will inflame. This confrontation will be less dramatic for companies who have integrated their telecommunications management functions. For those who have not, this integrating of organizations will be the major obstacle to overcome if the corporation is to be successful in applying new communications technologies. The obvious question is, who will gain total control of telecommunications (voice and data)?

Given that voice communications costs range between 85% and 95% of most corporate communications budgets, it is clear that voice managers, for a long time, have dealt with senior management regarding telecommunications budgets. The purchase of a PBX is often approved at the vice-presidential level, while DP sign-offs frequently occur at the directorial level.

Voice managers will have an edge in terms of absorbing new responsibilities and authority based on this exposure. But data managers hold a lead in understanding the digital technology now being applied to voice.

Operation Factors

Troubleshooting an interstate data link will be challenging. You may have to coordinate with the operating companies at both ends to troubleshoot the local loop portions of an interstate link. Your line technicians will call three telephone companies instead of one. Sound appealing?

On-premise installation of equipment and wiring is a new area that will afford cost reductions. At&T and maybe operating companies will allow you, the customer, to install hardware.

This will be a great opportunity for those willing to take the responsibility. Installations by the telephone company will become more parts- and labor-oriented instead of the current flat-rate charge. You must decide which approach is best.

Recommendations

Here are a few suggestions to help:

- Closely monitor AT&T and the operating companies with which your company must deal. The operating companies have been tentatively defined. It will be some time before all the smoke clears, but count on at least a 15% increase in local service rates soon after the operating companies are divested. Review the agreement signed by AT&T and the Department of Justice and contrast it with the report on telecommunications by the General Accounting Office. It is available free through the government (Report No. CED-81-136).
- The voice/data switch is here. You can best prepare for integrating this box into your network strategies by first learning about voice communications via an introductory course.
- The operating company, once established, will be looking to develop marketing teams similar to the AT&T teams of the past. Develop a list of at least 10 points describing how you want the operating company account team to interface with your organization. This list should be jointly developed by voice and data managers. The operating company teams will be interested in meeting your needs, so definitely state your needs. Above all, don't let the current AT&T team downplay these potential organizational problems.
- Rethink what the true cost for

(Continued on SR/6)

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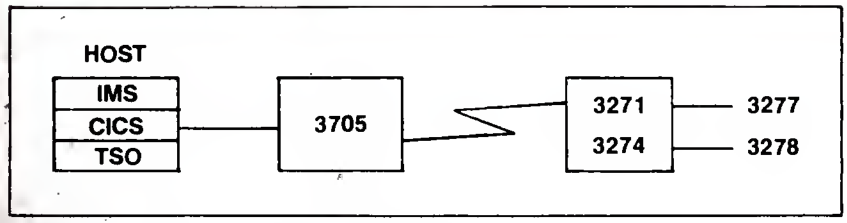


Figure 1

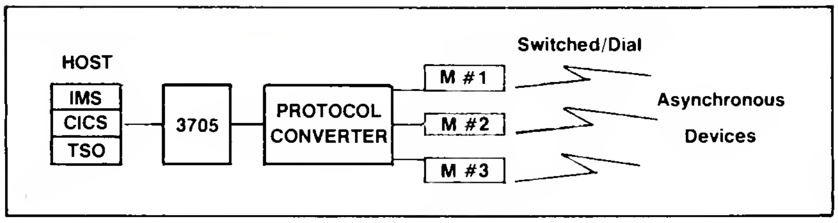


Figure 2

As Data Communications Alternative

Protocol Converters Coming Out of Closet

By Irwin Horowitz
Special to CW‡

Something very interesting has occurred during the past 12 months. Protocol converters have come out of the closet and are fast becoming a major alternative solution to many a data communications application. Protocol converters have been around for quite a while, but only recently have they gained significant enough functionality to be taken seriously.

That and the fact that nothing you buy today seems to be compatible with anything you bought yesterday have propelled these "black boxes" into a position where they must be taken seriously by communications designers. They come in various shapes and sizes, convert one protocol to another and sometimes even add functionality as well.

Since conversion can be accomplished on many levels, the communications designer will have to:

- Determine what kind of conversion is necessary. For example, does the application call for a communications protocol conversion (asynchronous to binary synchronous communications [BSC]) or does it entail the much more complex task of conversion from the vendor's document format to another's format?
- Determine if there are any off-the-shelf hardware/software products to do the job.
- Configure the network to include the function.

Emulates IBM 3270

There is one type of protocol converter that is gaining in usage because of the device it emulates, the IBM 3270. With such a large number of 3270s deployed in the market today, it was only a matter of time before an alternative, cost-effective solution would be found.

The 3270 protocol converters convert asynchronous, Ascii terminal input into standard 3270 streams and on the output side convert 3270 streams into asynchronous streams of data. They allow the users of low-cost; basic Ascii terminals to access exiting 3270 applications — for example, IBM TSO, CICS and IMS — without any major program modification.

This is accomplished by the converters essentially emulating all the functions of either a 3271 or a 3274 Model 1C. No program changes are necessary when utilizing a 3270 protocol converter. The 3270 data streams are written out to the protocol converter, which then translates those commands to the appropriate control sequences that will make the particular asynchronous terminal emulate the function — cursor, highlight a field and so forth.

Typical 3271 Configuration

Figure 1 shows a typical 3271 configuration with no protocol converters. In this configuration there is a leased line running from the front end to the 3271 controller, and the 3277s are accessing on-line applications at the host.

Figure 2 shows a configuration of asynchronous devices accessing a protocol converter at a central host site. To the 3705, the protocol converter is defined as one 3270 line with a 3271 controller and a certain number of 3277s. Each port on the protocol converter represents, in effect, one 3277 terminal.

For example, from an asynchronous terminal I would dial the number associated with modem No. 1. The protocol converter would then "detect" the speed I was running at (typically 300 or 1,200 bit/sec), as well as a special control sequence that I would enter at my terminal. That control sequence would identify my terminal type. Because I dialed in on port No. 1, the protocol converter "knows" that this is equivalent to port No. 1 on a 3271, typically, device address "40."

The 3271 control unit address assigned to the protocol converter would be set to control address "40." Therefore, all data coming from that port will have a control unit device address number of "4040." The second port would be assigned the device address "C1" and, No. 3 port would be device address "C2" and so on. All the addresses will conform to the 3271 address conventions. All data streams received on port No. 1, for example, will have a control unit device address of "4040."

When you compare Figure 1 with Figure 2, you see that though you have given 3270 functionality to the asynchronous terminal, you have also installed a dial-up network between the user (terminal) and the central site.

The protocol converter assumes the devices (asynchronous terminals) are unbuffered and provides an internal 1,920-character buffer for each connected device. Because the keyboard of the device must be logically disconnected from the display screen, the device must operate in full-duplex mode, in which only keyboard data is transmitted and the only data displayed is that which is sent to the device from the protocol converter.

As each keystroke arrives from the device, the protocol converter translates it and operates upon it according to the equivalent 3270 function, updating its internal buffer and display screen accordingly. The translation depends on the type (manufacturer and model) of device, since most devices do not provide all the special 3270 function keys, and those that are provided are generally encoded differently by different devices.

> *'There is one type of protocol converter that is gaining in usage because of the device it emulates, the IBM 3270. With such a large number of 3270s deployed in the market today, it was only a matter of time before an alternative, cost-effective solution would be found.'*

Internal (protocol converter) buffered data must be translated prior to sending it to the display screen for the same reasons, since such functions as erasing a screen, setting cursor address and so forth must be encoded differently for different devices. Furthermore, not all devices provide the same visual attributes, screen editing functions or function keys.

Addressable Cursor Function

In order to achieve compatibility with the widest possible range of devices, the protocol converters usually require only one basic function — an addressable cursor. If visual attributes and function keys are provided, they are generally used, but need not be present for satisfactory emulation of 3270 functions.

Most of the 3270 protocol converters on the market today provide the following functions and capabilities:

- Teletypewriter (TTY)-to-3270 protocol conversion.
- RS-232 as well as RS-422. (The RS-422 connection would allow the user to communicate at full speed with terminals located well over 2,000 feet away from the protocol converter).
- Automatic speed detection.
- Support for a wide variety of TTY terminals. Vendors are adding to the list daily, since most TTY/asynchronous terminals look pretty much the same.

Additional Features

Some of the protocol converters have been introduced to the market with some additional features such as:

- Support for two host links. The protocol converter, in this case, will look like two 3271s, each dropped on its own line. This gives you some additional flexibility in configuring the network (see Figure 3).
- Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC). Some of the protocol converters now support physical unit Type 2 within the SNA architecture.
- Support of personal computers. Most personal computers have asynchronous communications packages available to them which, when tied to the 3270 protocol converter, will be able to access the 3270 host application.

There are three main reasons why one might implement 3270 protocol converters:

- Cost. By developing low-cost TTY devices in place of expensive 3270 devices, a site could cut CRT workstation costs by as much as 75%.
- Flexibility. TTY compatibility also means accessibility to external time-sharing services, which means one terminal device for all functions.
- Home access. You might give asynchronous terminals to select individuals so they can have access to on-line 3270 subsystems and applications.

'A Good Selection'

In summary, implementing a protocol converter with asynchronous devices would seem to be a good selection, given the above criteria.

The asynchronous terminals are cheap; no programming modification is needed; and there is even a migration path to either a 3270 leased configuration if the traffic calls for it, or a personal computer if the application calls for it.

Horowitz is a communications consultant with Westinghouse Corp. in Livingston, N.J.

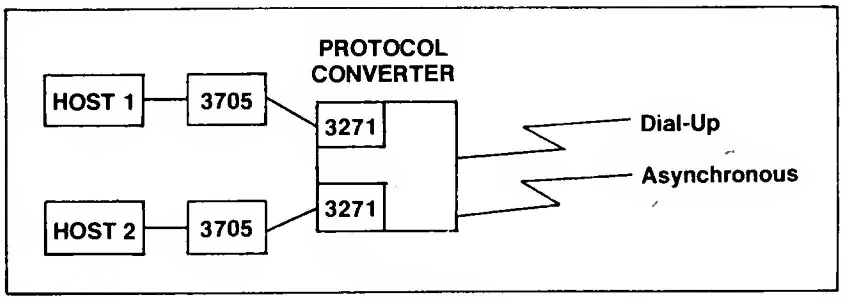


Figure 3

Shift in Technology-Based Outlook

Local-Area Networks Defined by Geography

By Bill Myers
Special to CW‡

Proponents of local-area networks engaged in discussions now commanding attention in trade and business publications often lose sight of customer needs. Too often, their arguments reflect a technology-searching-for-applications outlook rather than the converse. Such thinking also reflects a popular misconception that local-area networks are defined by technology and, therefore, are cable-based systems.

The truth is that geography defines a local-area network. Thus, any one technology, or perhaps a combination of those, may be appropriate for a given set of customer circumstances and needs.

Choice of Configurations

Whether operated within one building or in a campus-network-type arrangement whereby several buildings are interconnected, local-area networks can be configured using coaxial cable-based systems, twisted pairs supported by short-haul modems, line-of-sight microwave modems and fiber-optic arrangements, as well as using private-branch exchange (PBX) networks.

Present and future requirements for both voice and data transmission are the key to designing an effective local-area network configuration.

The first consideration is the speed at which data must be moved. The need to move data at speeds greater than 19.2K bit/sec limits a network designer's options. Coaxial cable-based systems seem to win by default in applications involving large numbers of high-speed printers, CPU-to-CPU transmissions, memory devices, mass storage data transfers and other high-speed applications, if only until fiber-optic systems become practical. Until that time, the answer is coaxial cable.

Even if a coaxial cable system is required, the entire data network need not use that one system. Because in most operations 80% to 90% of data is transmitted at 19.2K bit/sec or less, it is far more efficient to have an alternate data switch system to handle the multiple terminals, workstations, printers and other low-speed, low-use items.

Merits of Duplicate Net

Some might question the cost-effectiveness of having duplicate networks, but consider the merits of this approach. Coaxial cable-based systems are extremely efficient in transmitting high-speed data, but such is not necessarily the case for low-speed data or a combination of low- and high-speed data.

For example, Digital Equipment Corp.'s Ethernet local-area network is a coaxial-cable-based system designed for interconnecting a number of low-speed stations. It is also suitable for supporting high-speed stations. Unfortunately low-speed stations entering the network can interfere with the continuous flow of blocks from the high-speed stations and dramatically reduce network throughput because of Ethernet's collision-detect feature.

Installation costs of coaxial cables are considerably higher than those for wire pairs because use of existing wire pairs can in many cases minimize cabling costs. This situation is rarely true of coaxial cable.

A second factor is flexibility. Adding on and moving outlets in coaxial-cable networks is restricted and requires higher skill levels among technicians than is true of installing conventional wire pairs. Finally, the system reliability of wire-pair systems is substantially greater than that of coaxial-cable systems.

First, backup provisions usually exist in wire-pair systems. Second, because most networks using wire pairs are "star" configurations, a single-line failure only affects one station and is not generally catastrophic. Coaxial-cable "bus" configurations, on the other hand, are more susceptible to multiple-station failures.

The selection of a data switch or coaxial-cable-based system determined by present and future data transmission speeds is only one of the network decisions requiring careful attention. There remains the question of whether to combine data switching with voice switching or to keep the two separate. As in the case of data switches vs. coaxial-cable-based systems, advocates of each type of network present convincing arguments.

Questioning Costs

Proponents of combined voice/data networks contend that the cost of duplicate arrangements is higher than having one network provide all required services. Today, however, a voice/data interface generally costs over $1,000, whereas a data-only interface or voice-only interface can be provided for around $250.

Although many see these costs rapidly converging to near equivalence by the end of this decade, that is not the case currently, and there are those who think that it will never happen.

The fact remains that the complexities involved in combining voice and data are hardware- and software-oriented. The predictable nature and explosive growth of data transmission has intensified development among hardware and software manufacturers greatly to expand current technology. Network operators' priorities are naturally geared to handle the high volumes of voice traffic, and PBX manufacturers have responded to that need with hardware and software geared to voice transmission rather than to combined voice/data transmission.

Perhaps even more significant than the software implications are the future needs for data transmission switching. Operators of local-area networks will experience enormous increases in requirements for various gateways to access outside transmission services.

As this occurs, data functions will become more and more complex and important. With multiprotocol data transmission and high-speed switching requirements, the switch becomes the critical link in allowing these data flows.

Intelligent data switches will be distributed throughout a network rather than centralized in location. They will provide enormous power and flexibility to the network operator. By separating the voice and data functions, data system managers will have the flexibility to select hardware attuned to meet their own network requirements.

Modem design is an excellent example of the rapidly changing hardware technology. Modems, as we know them today, will soon be replaced by a single chip. Today, 80% of a modem's cost is for the "data pump," and 20% is for the extra features. As the technology progresses, this ratio will be reversed.

Intelligent, software-driven modems will become an integral part of the data communications system. Their greatly increased capabilities will include completely automatic operation and yield significant cost benefits.

International Data Corp. predicts that the market for 4.8K and 9.6K bit/sec, four-wire, leased-line modems will be nearly $1 billion by 1985. Given this economic stimulus, hardware manufacturers will unquestionably pursue the market aggressively. By the late '80s, 9.6K bit/sec, two-wire, full-duplex modem systems should be available for under $1,000 per connection.

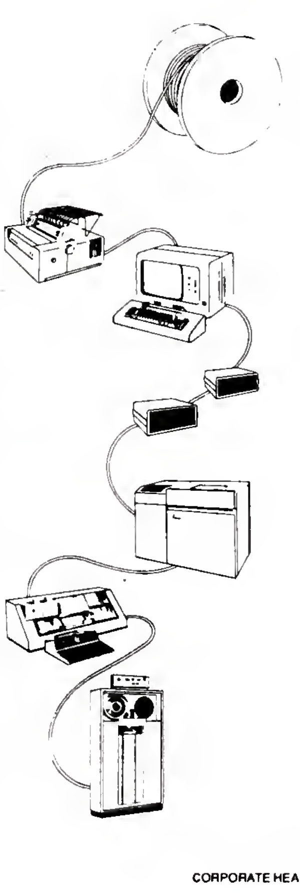
Because this development will greatly reduce the need for leased lines, users will achieve major cost benefits and greatly improved system reliability. It is this kind of rapidly emerging hardware development that will not be easily integrated into combined voice/data networks.

The Correct Solution

The correct solution for local-area network operators will be, and should be, based on cost-effectiveness, flexibility and system reliability. The battle of the networks will continue for many years.

In data transmission, the explosive growth and ever-expanding requirements for greater capability will undoubtedly result in multiple network arrangements, optimized for each user's needs.

Myers is the vice-president of marketing for Prentice Corp., based in Sunnyvale, Calif.



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Teleprocessing Systems Gaining in Popularity

By Ronald R. Thomas
Special to CW‡

Teleprocessing systems combine DP with data communications. Such systems have become extremely popular in recent times. The most sophisticated versions are the on-line, real-time systems. These are used frequently for inquiry/response applications by financial institutions and airlines.

These are usually critical applications where system availability, capacity and response time are extremely important (see box below).

Availability means that the system is operating. It is similar to having a company vehicle available in the parking lot. Capacity means that the system is capable of carrying the load provided by the users. This is similar to the company vehicle being able to carry all the passengers for a trip. Response time is the time elapsed between an entry and a response. This is similar to the how fast the company vehicle will go.

Standards are required to evaluate teleprocessing system performance. This requires some quantitative measurement. Availability is typically described in terms of system "uptime." This could be the percentage of time the system was up and operating compared to some predefined standard.

Capacity is often described in terms of transaction volumes. This could represent the ability of the system to handle a certain volume of traffic over a certain time period. Response time, particularly with on-line, real-time systems, is frequently described by the number of seconds it takes for the user to enter information and then receive a response back from the system.

System Components

First it is necessary to understand the individual components that contribute to teleprocessing system performance. The component most visible to the user, and the one that appears to represent the total system, is the terminal.

While it is the entry component of the system, it represents only the tip of the iceberg.

Terminal performance must be considered in terms of meeting the user's needs. This includes consideration toward ease of operation and handling the work load. Terminal performance must be clearly differentiated from total system performance.

A 30 char./sec terminal might be too slow to handle a user's work load. However, the total system might not be capable of supporting a faster terminal. The relationship between the terminal and total system performance must be clearly understood.

The next component in the system is the communications channel. Communications channels are described in terms of the transmission rate they can handle. A 300 bit/sec channel is relatively slow, and 9,600 bit/sec is considered to be a relatively fast channel. A 9,600 bit/sec channel is much more expensive than a 300 bit/sec channel.

The communications channel must be able to move data to and from the terminal so that total system requirements are met. Obviously, the communications channel must match up with the terminal speed. It makes little sense to connect a 9,600 bit/sec communications channel to a 300 bit/sec terminal.

The communications channel connects to a communications controller or front-end processor. A communications controller serves as a hardware interface to the CPU. A front-end processor serves as both a hardware and software interface.

The front-end processor or communications controller receives data from a terminal, removes header information, routes the data to the CPU, receives the reply after processing and returns it to the proper terminal.

The main memory is also connected to the CPU. It is similar to the gas tanks on an airplane: It must be large enough for the typical trip, but if it is too large, the passengers pay for capacity that is not required. Quite often main memory is allocated in some manner, similar to multiple fuel tanks on an airplane.

The concept of virtual memory goes along with real physical memory. With this approach, the main memory has access to storage space on auxiliary storage devices including disk drives. Information stored on disk is "paged" in and out of real memory as required.

The net result is that the real main memory capacity appears to be much greater. However, when considering system performance, the need for excessive paging must be considered. Excessive paging can create problems and turn an advantage into a real disadvantage.

Peripheral storage devices, disk drives and tape drives are also connected to the CPU. Application programs and files are stored on these devices.

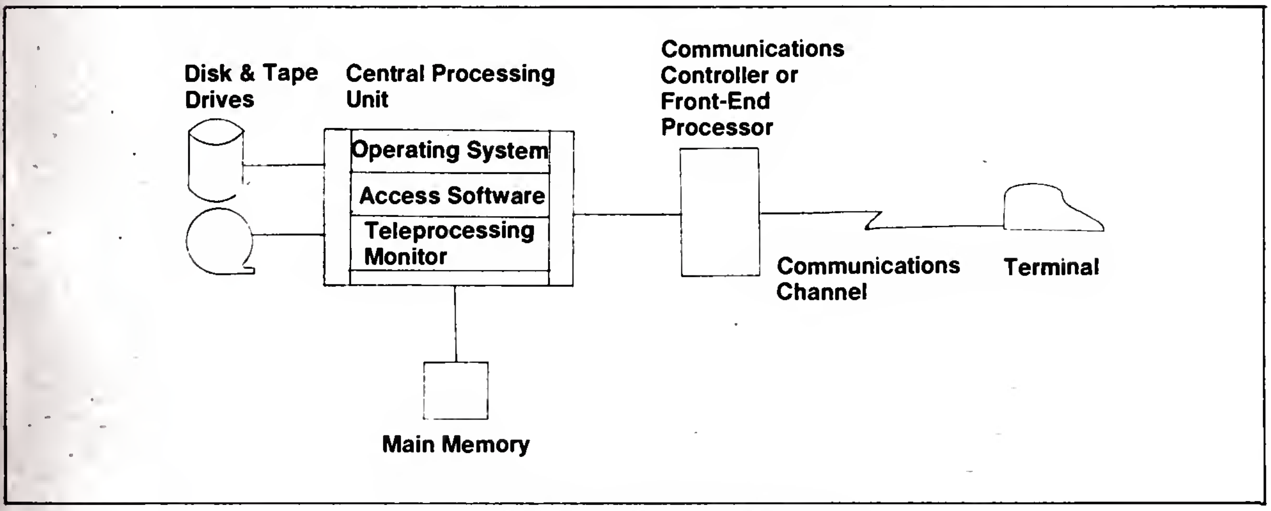
Typically, disk drives are used heavily in on-line systems due to their fast access time. However, information has to be properly distributed over these storage devices to properly balance the load. Teleprocessing system response time can be dramatically affected if the CPU has to keep waiting for information from disk or tape drives.

Software

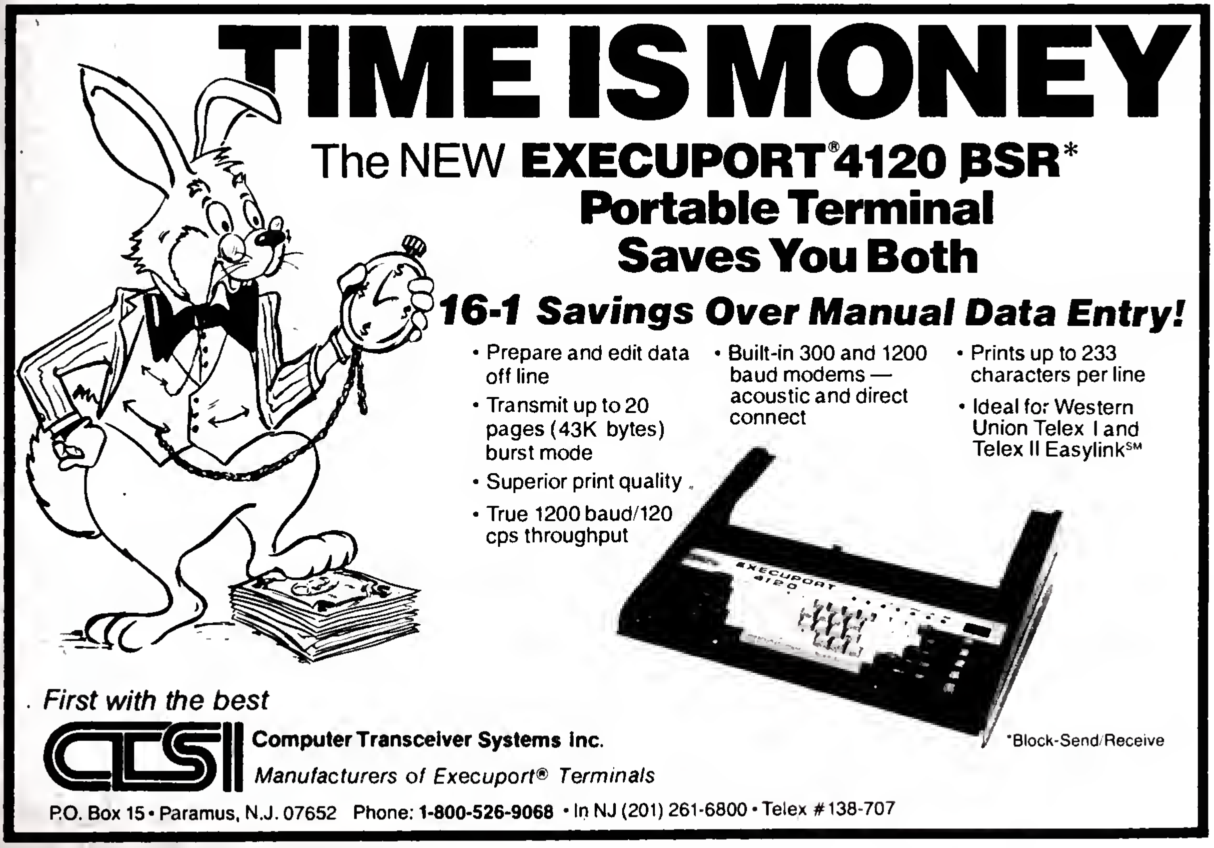
Thus far we have primarily considered hardware components. However, software is the driving force of the system. Software is critical in teleprocessing systems because of the random arrival of work. Unlike batch systems, where work can be controlled and scheduled, work from teleprocessing terminal devices arrives in a random fashion. Software must be able to deal with this random traffic and frequent interruptions.

The software in the front-end processor is designed to off-load processing functions from the CPU. Polling lists and error detection are among the functions performed by this software. These are all critical functions in a teleprocessing envi-

(Continued on SR/6)



An On-Line, Real-Time Teleprocessing System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Managers Must Plan for AT&T Deregulation

(Continued from SR/2)

teleprocessing is at your installation. Disk space, communications user programs, front-end processors, network time, equipment, space, personnel and so on are just a few of the cost elements that make up network services.

- Begin evaluating electrical contractors capable of installing communications equipment. You will be allowed to own your on-premise wiring and can therefore manage it more effectively than in the past. Or better yet, begin training one of your staff members to install or deinstall modems and other equipment.

> *'As two kingdoms come together (voice and data) the territorial egos of both organizations will inflame. This confrontation will be less dramatic for companies that have integrated their telecommunications management functions. For those that have not, this integrating of organizations will be the major obstacle to overcome if the corporation is to be successful.'*

- Prepare your network control group for dealing with three or more telephone companies when troubleshooting interstate links. Systematize problem diagnosis and problem escalation activities. Improve problem tracking documentation. Analyze the grade of service you have experienced during the past year. This analysis will be a benchmark for evaluating operating company service.
- Reassess your current network plans for the next six to 18 months. Identify crucial projects and correlate their implementation dates with the most recent divestiture schedule.
- Develop scenarios that employ newly announced enhanced services. Using an unrestricted imagination, develop strategies that will help meet corporate goals.
- Keep your management informed. Present them with demonstrable facts and suggest your conclusions. Preparing your management and arming them with some "worst case" business situations can be useful. Doom and gloom scenarios tend to get more attention than rose garden scenarios.

This list is by no means authoritative. Use your professional skills to enlarge it. Stretch your management skills to new limits.

Jankowski is a freelance contributor, based in McGaw Park, Ill.

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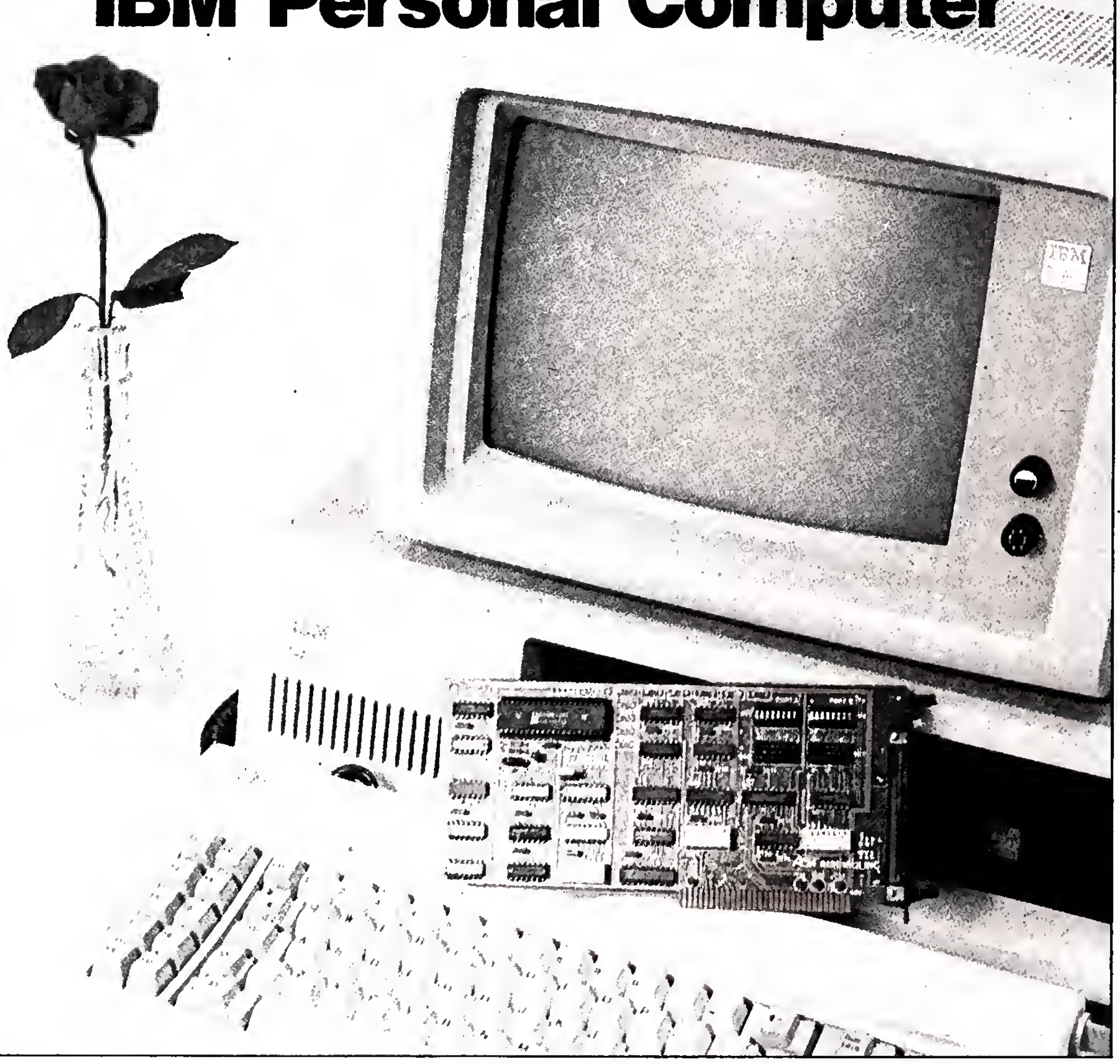

2780/3780 emulation is now possible with the IBM PC, AST3780 package which includes the hardware, software on diskette and documentation to enable the versatile IBM Personal Computer to emulate the 2780/3780 terminals. 327X emulation will be available.

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Teleprocessing Gaining Favor

(Continued from SR/5)

ronment.

In an on-line, real-time teleprocessing system there may also be a teleprocessing monitor. It is designed to assume some of the software burden of being in a communications environment. The monitor helps to relieve the application programs of concerns about the communications environment.

All this software has its own capability to be turned and adjusted for maximum performance. It must be able to function in harmony with the hardware and communications environment.

Performance Analysis

Methods to analyze teleprocessing performance range from simple to very complex. Among the simple techniques are manual logs and reports. A terminal fails, and it is logged out of service. When it is working again, it is logged back in service. This is a simple technique, yet it can provide valuable data.

On a more sophisticated level, the computer system software often generates reports and data as part of its normal operation. Additional system software is usually available to further monitor and analyze system performance. It may, however, place some additional load on the system.

In quantitative terms, we are trying to imitate a physical activity, the operation of a teleprocessing system. This analysis is performed by using a computer and some type of software package. Like all computer-aided analysis, it will only be as good as the input data and the software analysis tools.

In all this analysis, we are concerned with total traffic volumes through the entire teleprocessing system as well as the peaks and valleys.

Thomas is a telecommunications consultant in business and industry and a freelance author.

'Backbone' Provides for Future

Bank Solving Growth Dilemma With Data Net

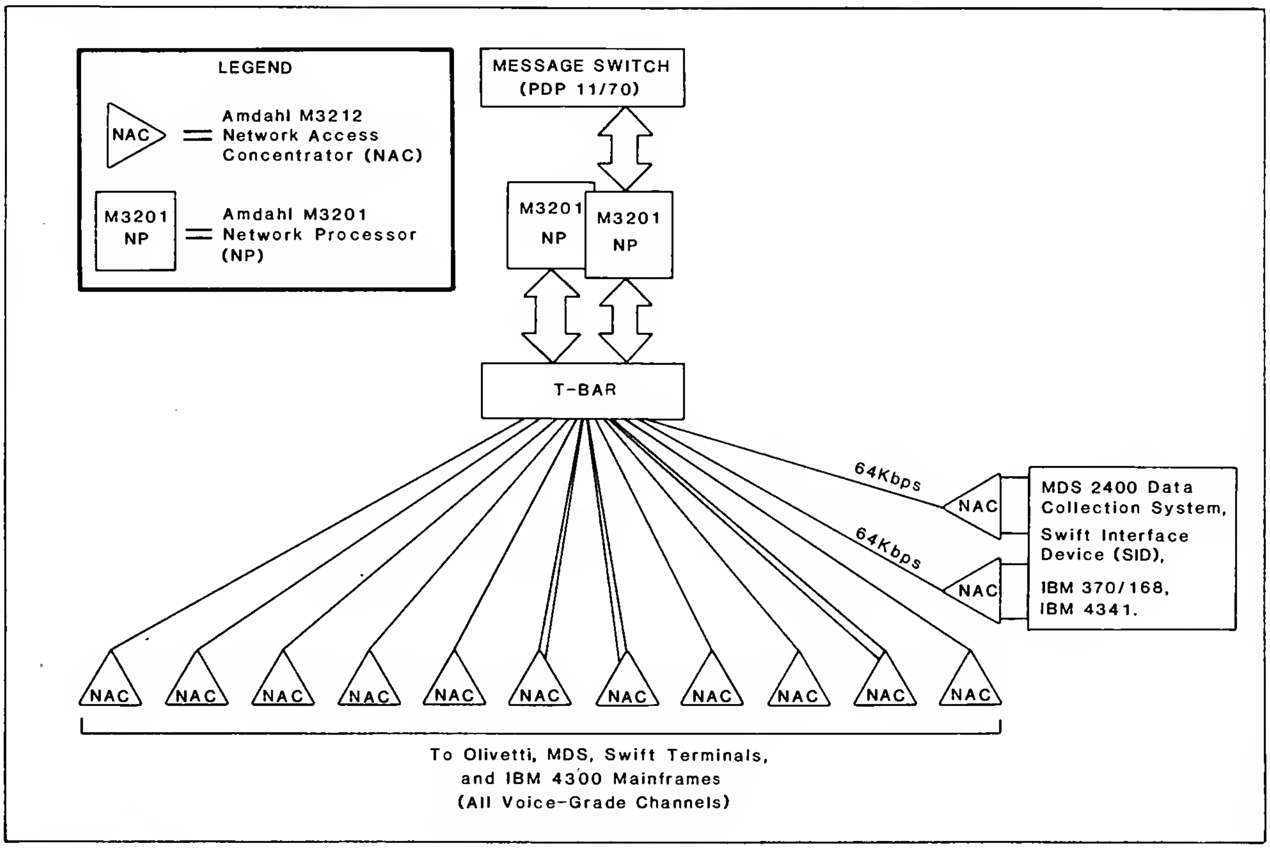
LEGEND
NAC
= Amdahl M3212 Network Access Concentrator (NAC)
M3201 NP
= Amdahl M3201 Network Processor (NP)
MESSAGE SWITCH (PDP 11/70)
M3201 NP
M3201 NP
T-BAR
64Kbps
64Kbps
NAC
NAC
MDS 2400 Data Collection System,
Swift Interface Device (SID),
IBM 370/168,
IBM 4341.
NAC
To Olivetti, MDS, Swift Terminals,
and IBM 4300 Mainframes
(All Voice-Grade Channels)

Figure 1: Bank of Rome's present configuration. The T-Bar switch links incoming traffic to either the primary or backup M3201.

Special to CW‡

ROME — The Bank of Rome (BOR) faced a big dilemma. By late 1979 it was recognized as the fourth-largest financial institution in Italy and among the largest in the world. That was the good news. The bad news involved future growth, which seemed destined to be stunted by the lack of an efficient data communications network to link the bank's more than 300 branches.

In early 1980, the BOR found a solution to its problem in the form of an M3200 communications network from Amdahl Corp.'s Communications Systems Division. By installing a "backbone" network designed to be built upon, the bank not only solved its present problems, but also gained the means to meet forecasted communications needs.

Today, with a general-purpose integrated network based on two M3200 Network Processors and 13 M3212 Network Access Concentrators (NAC) (Figure 1), the bank's more than 13,000 employees throughout Italy are connected via on-line terminals.

Functions Supported

The network supports a broad range of functions, including teleprocessing, data collection, message-switching applications, electronic funds transfer from the Society for Worldwide Interbank Financial Telecommunications (Swift), electronic mail and stock exchange broadcasting.

Eleven of the network's NACs are located in major bank branches; the two remaining are installed in Rome to provide access to resources there. Included among those resources are the following: a message switcher based on two Digital Equipment Corp. PDP-11/70s, three Mohawk Data Sciences Corp. 2400 data collection systems, two IBM 370/168s and one 4341 mainframe, two Burroughs Corp. B1900 computers (Swift interface devices) and one Prime Computer, Inc. processor (Figure 2).

The networking system presently connects the following terminals and remote systems:

- About 250 asynchronous Olivetti Corp. TCV 450 terminals (110 bit/sec) dedicated to message switching, telex and electronic mail applications.
- About 240 Olivetti TC 800 terminals dedicated to teleprocessing applications. These terminals are distributed over 20 multipoint lines at 1,200 bit/sec.
- Seven MDS data collection systems running at 4,800 bit/sec.
- Approximately 35 Burroughs terminals running at 1,200 bit/sec dedi-

(Continued on SR/8)

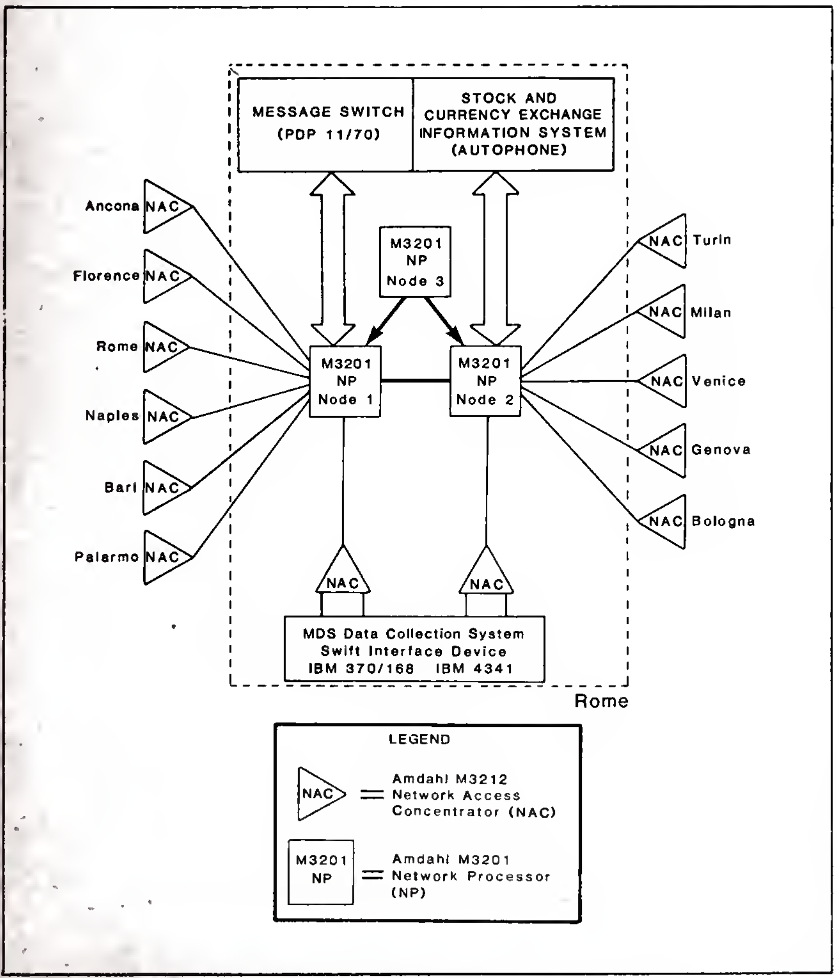
MESSAGE SWITCH (PDP 11/70)
STOCK AND CURRENCY EXCHANGE INFORMATION SYSTEM (AUTOPHONE)
Ancona
Florence
Rome
Naples
Bari
Palermo
NAC
M3201 NP Node 3
M3201 NP Node 1
M3201 NP Node 2
Turin
Milan
Venice
Genova
Bologna
MDS Data Collection System
Swift Interface Device
IBM 370/168 IBM 4341
Rome
LEGEND
= Amdahl M3212 Network Access Concentrator (NAC)
M3201 NP
= Amdahl M3201 Network Processor (NP)

Figure 2: Bank of Rome Network Evolution (1982)

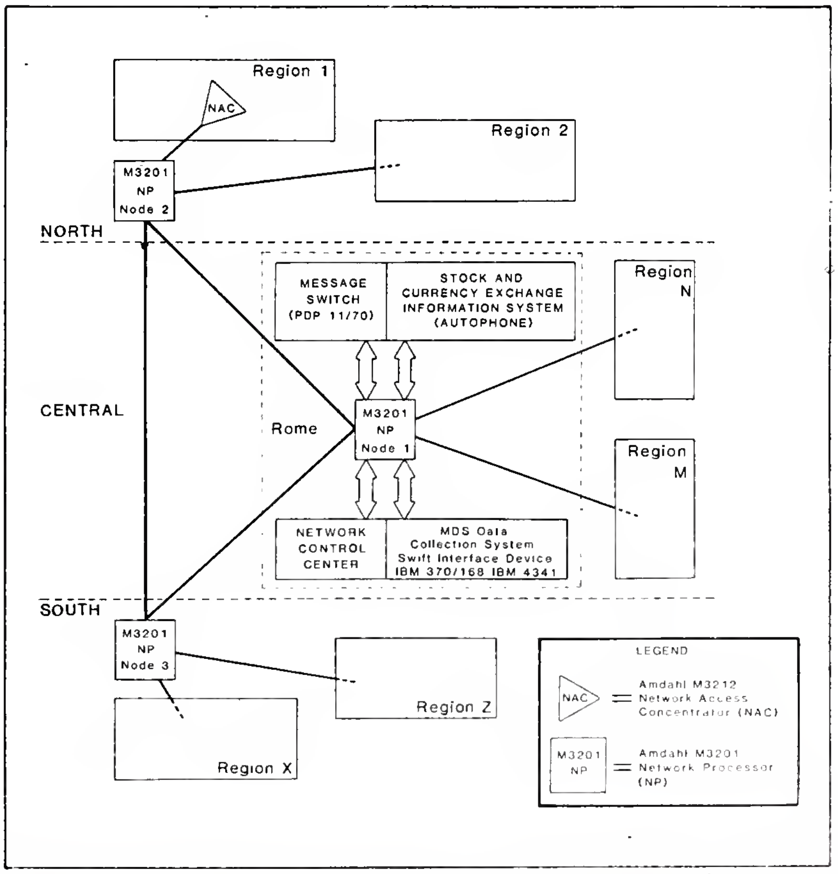
Region 1
NAC
Region 2
M3201 NP Node 2
NORTH
MESSAGE SWITCH (PDP 11/70)
STOCK AND CURRENCY EXCHANGE INFORMATION SYSTEM (AUTOPHONE)
Region N
CENTRAL
Rome
M3201 NP Node 1
Region M
NETWORK CONTROL CENTER
MDS Data Collection System
Swift Interface Device
IBM 370/168 IBM 4341
SOUTH
M3201 NP Node 3
Region Z
Region X
LEGEND
= Amdahl M3212 Network Access Concentrator (NAC)
M3201 NP
= Amdahl M3201 Network Processor (NP)

Figure 3: Bank of Rome Network Evolution (1983). Plans call for a three-node network serving 11 regional centers.

Bank Solving Growth Problem With Data Net

(Continued from SR/7)

cated to electronic funds transfers between the BOR branches and correspondent banks in the rest of Europe via the Swift trans-European banking network.

The Rome location has a Swift interface device, which is based on two Burroughs B1900s, for connecting the branches to two national Italian Swift concentrators in Milan. From Milan, connections can be made to the Swift centers in Brussels, Belgium and Amsterdam, Netherlands with connections from the BOR branches originating in the M3200 network.

- Six IBM 4300 series mainframes connected to the IBM 4341 in Rome for file transfer applications via 4800 bit/sec trunks.

As a complete line backup for all digital links of the network, the BOR installed a private telephone network based on 15 switching nodes, which are located in the major bank branches.

The end result of this extensive network installation, according to a senior BOR official, has been substantially increased cost-effectiveness of everyday operations and greater overall efficiency.

But that's not the end of it. The bank anticipates a fairly large expansion of the present network to allow more on-line interactive communications and greater terminal access to its mainframe computers.

1982 Plans

Plans during the remainder of 1982 include the connection of additional 300 Olivetti WS 580 terminals (some of them running at 300 bit/sec) for message-switching and electronic mail applications and stock and currency exchange inquiry applications performed by a specialized computer system designed by Autophone. This system will be installed in Rome.

During 1982, the bank also anticipates connecting 12 additional remote IBM 4300 series mainframes to the Rome IBM 4341. In order to accommodate the relevant traffic increase, the M3200 network topology will be modified to include additional on-line nodes (from one to two) and utilize a third in a backup mode (see Figure 3 on SR/7).

During 1983, the bank anticipates connecting 22 IBM 4300 series mainframes, as well as evolving the M3200 network into a three-node system. Along with that will come the completion of the distributed processing architecture based on 11 regional DP centers.

11 Regions

From the BOR's point of view, Italy is divided into 11 distinct regions. Plans call for each region to have a regional DP center based on IBM 4300 mainframes plus either one or two M3212 NACs, depending on the traffic.

The M3212s will connect terminals for message switching, stock exchange and Swift applications, as well as facsimile and word processing applications.

Teleprocessing terminals will be connected to the 11 regional DP centers, which in turn will be connected to the Rome headquarters supercenter through the M3200 network.

Once all of these plans have been implemented, the BOR will have achieved two major goals: distributing its processing power and putting a general-purpose integrated network to use.

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Network Evolution Charted

Net Management Potential for Savings Dramatic

By Tim Ahlstrom
Special to CW‡

Data communications networks were created to allow large computer users to capitalize on the advantages of distributed real-time processing in improving service and in controlling costs. As the networks evolved, methods were developed to determine how, and how well, they worked. These methods fall into three rough categories:

- *Network monitors.* First to be developed were various technologies to monitor the physical status of the network, including the lines, control units, modems, terminals, front-end processors, and the like. Network failure was defined simply as equipment or facility failure — a time out, no polling, or a line out — and the task was to identify the failed component as soon as possible.

Operating Performance

Once the general outlines of physical monitoring had been determined, it was possible to move to the next level of monitoring, that of operating performance. Here the focus shifted to such items as response times, message volumes, line and terminal utilization and capacity and availability of network components to users. While the task was still to monitor, failure was more broadly defined to include the network's inability to provide timely service to its users.

- *Network control.* The second task was network control, which requires somewhat different technologies. Monitoring identifies and to some extent may diagnose a network problem. Control enables direct intervention to correct that problem. The focus thus shifted again, to line switching, network reconfiguration, line restarting, front-end processor backup, host switching, detouring generally around failed equipment and acquiring new lines and equipment to add capacity or merely to add redundancy.

Gradually, as hardware and facility failure problems were conquered more simply and routinely, the definition of failure was considerably expanded to embrace more sophisticated problems of response time, system availability to end users and other productivity-related issues. Control and monitor technologies gradually enabled network managers to routinize their operations — to act, not react — by anticipating problems rather than waiting for user phone calls.

- *The need to manage.* Together, monitoring and controlling technologies provide powerful tools to help operate networks. But they do little to facilitate network management, which requires evaluation and planning of current and future use and resources. To do that requires considerable usable current and historical data describing not only the physical characteristics of the network (facilities and equipment and their configuration), but also analyzing the performance of the entire network and every element. The analysis must enable informed managerial judgments about the availability and utilization of network services by users so that current services can be improved, future services planned and costs controlled.

Under the twin imperatives of productivity and cost control, major corporations have thus progressed from net-

(Continued on SR/10)

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Deetsy Armstrong/Mgr. Distributed Systems/SAFECO.

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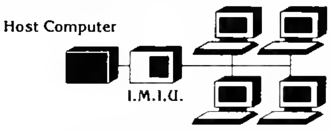

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CW/9-27

Network Management Seen Necessary as Nets Evolve

(Continued from SR/9)

work monitoring to network control and are now exploring the frontiers of network management.

- *Network management.* Network management implies an automatic system for continuously gathering and analyzing information about all characteristics of a data communications network and its operations and converting that information into current and historical displays and reports that allow:
- Network operators to monitor and control the network.
- Network managers to evaluate and improve its performance and availability to users and to control costs.
- Network planners to determine its future growth based on demonstrated needs and use patterns.

The system should constantly monitor operations, equipment elements, data transmissions and individual applications, as well as provide dynamic, real-time pictures and historical analyses of network operations and performance at several levels of aggregation: network, line group, line, control unit and device.

It should automatically identify potential and actual hardware, software and line problems, assist operators to diagnose their cause, suggest available corrections and facilitate remedial action. It must produce information that can be readily used to identify trends, anticipate needs, plan growth, identify over- and underutilized lines and equipment for elimination and reallocation, minimize downtime, increase productive uptime, help satisfy users and control costs.

Three Kinds of Service

A network management system should provide three basic kinds of service:

- It should enable network operators to recognize operating and configuration problems immediately so they can intervene in a timely fashion to correct them. By providing a window into the network, the system should be able to monitor every line and piece of associated equipment, spotting trends in service degradation and enabling intervention before a problem affects service by users. By tracking network performance, the system should also help operators to pinpoint more precisely the nature of a problem, thereby helping to solve it quicker.
- It must provide network managers with usable information about network performance, capacity, utilization, configuration and availability so they can better control costs, allocate the resources at their command and maintain or improve service levels.
- It must enable network planners to analyze resources, project needs and base growth according to actual use rather than anecdotal impressions from users and estimates from managers.
- *Evolving technology.* Just as network management tasks have evolved from simple to successively more sophisticated levels, the technologies that handle those tasks have also progressed.

Automatic Intervention

From passive monitoring that required extensive operator interpretation, the emphasis is now on automatic alerts based first on equipment or line failures, but in more sophisticated applications, also on user-defined limits on such items as transmission volumes and response times.

From manual intervention, advanced installations can now offer significantly simplified or even automatic intervention, such as automatic line restarts, electronic matrix switching (instead of cumbersome and error-prone manual switching and patching), automatic remote-site monitoring and electronic reconfiguration.

From complicated and time-consuming analysis of mountains of operating data, it is now possible to organize usable current and historical comparative information on utilization, performance and availability in traditional tabular form, but also in immediately interpretable graphics, thereby simplifying not only day-to-day operation and management, but also long-term planning.

- *Network management's impact on productivity and costs.* A network management system should have major productivity and cost impact in a variety of ways.

Unneeded and underused lines and equipment should be easily identified. In a large network, almost no matter how busy it is overall, there are unnecessary terminals and lines that can be eliminated for thousands of dollars of annual savings. Or they might be reallocated to heavy-use areas, thereby improving service availability, or might be used for planned growth, eliminating the need for new purchases.

Dramatic Savings Potential

In any event, the potential for cost savings and cost avoidance is dramatic, perhaps as much as $1,500 per month per terminal when line, staff and equipment are all taken into account.

Spotting service degradations early and simplifying troubleshooting and problem solving can save hundreds of operator man-hours yearly. Automatic alerts and automatic or electronic intervention for restarts or switching can often solve problems before user service is affected at all. The effect is both a more productive and often smaller operations staff, as well as maintenance of service to users, service that might otherwise have gone down. Operators do a better job quicker.

Reducing downtime is a natural result of early problem diagnosis and simplified intervention. Its effect is reduced overtime and late work for users and, not insignificantly, reduced toll charges for trouble calls.

Ahlstrom is president of Avant-Garde Computing, Inc. in Cherry Hill, N.J.

Key to Office of Future

Integrated, Local Distributed Net Fills Gap

By Jack Freeman
Special to CW‡

An integrated, or hybrid, local distributed network is the missing link in the ultimate realization of the "office of the future."

Such a complementary network will tie together the hardware and software, allowing flexible additions of new workstations and processors as they become available, despite the failure to standardize at more than the most elementary level.

For some time, the information world has been moving toward separate local and distributed networks that are interconnected in some manner. Office product manufacturers gravitated toward local networks to sell more workstations.

Manufacturers of equipment such as modems and multiplexers and equipment designed primarily to interface with telephone common carrier facilities have been among the forces driving toward distributed networks.

However, the integrated, local distributed network that uses private packet-switching elements interconnected locally by regular telephone wiring and any one or more distributed carriers for the distributed portion offers substantial advantages.

Cost Factors

Until recently, the cost factors of such a network have been very high. A major change is that new, low cost, packet-switching elements are now available. They compare favorably in cost with the dedicated local networking interfaces and require no special wiring for installation.

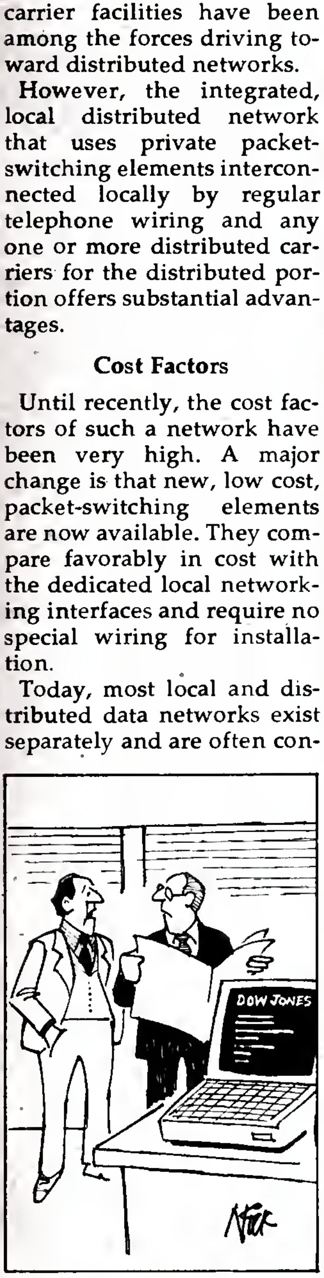
Today, most local and distributed data networks exist separately and are often connected through computers. Networking through a CPU in this way is costly for three reasons.

- Most computer-to-computer networking protocols, even the so-called efficient ones, are wasteful of transmission bandwidth.
- Using a mainframe or minicomputer to manage routine communications functions from an attached terminal to another host wastes expensive computing power.
- Computer networking schemes are generally restricted to the hardware of a single vendor, making it difficult to network between different makes of CPUs that use manufacturer-supported networking hardware and software.

Nevertheless, networking via vendor-supplied architecture, though it may be highly unsatisfactory, probably accounts for the majority of communicated data today because it is supported by IBM and Digital Equipment Corp.

The new generation of mi-

(Continued on SR/14)



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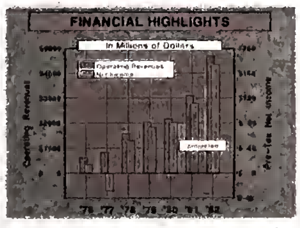

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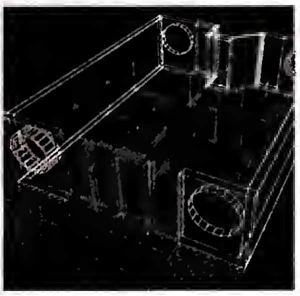

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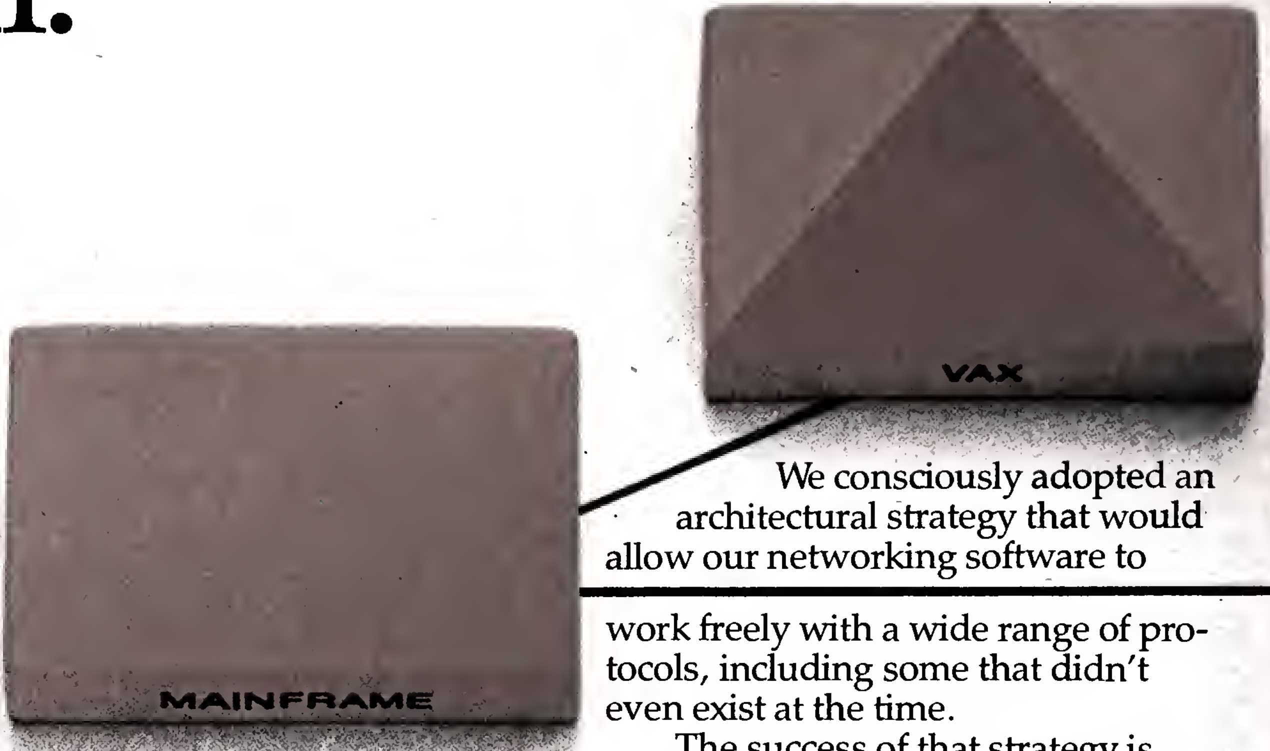
Networking standards. Nobody keeps your options open like Digital.



By now, everyone understands the need for standard communications protocols. Without them, an electronic Tower of Babel would surely ensue. But there have to be different standards for different networks. A local-area network is different from a wide-area network. A public network is different from a private one.

No single universal standard has emerged. Nor is one likely to. There are simply too many diverse networking environments, each fulfilling specific, mutually exclusive needs.

That's why Digital is committed to supporting and, in fact, actively promoting the more important standards now surfacing in the various environments.

Our goal is to offer our customers a range of standards to achieve any combination of networking objectives. And we've been pursuing that goal for many years.

A forward-thinking strategy.

When we first developed our networking architecture, we understood the need for flexibility. We consciously adopted an architectural strategy that would allow our networking software to work freely with a wide range of protocols, including some that didn't even exist at the time.

The success of that strategy is now becoming apparent. As more vendors enter the networking field, Digital is uniquely positioned to offer compatibility with the emerging protocols. We've gone farther than anyone to assure that your options are open.

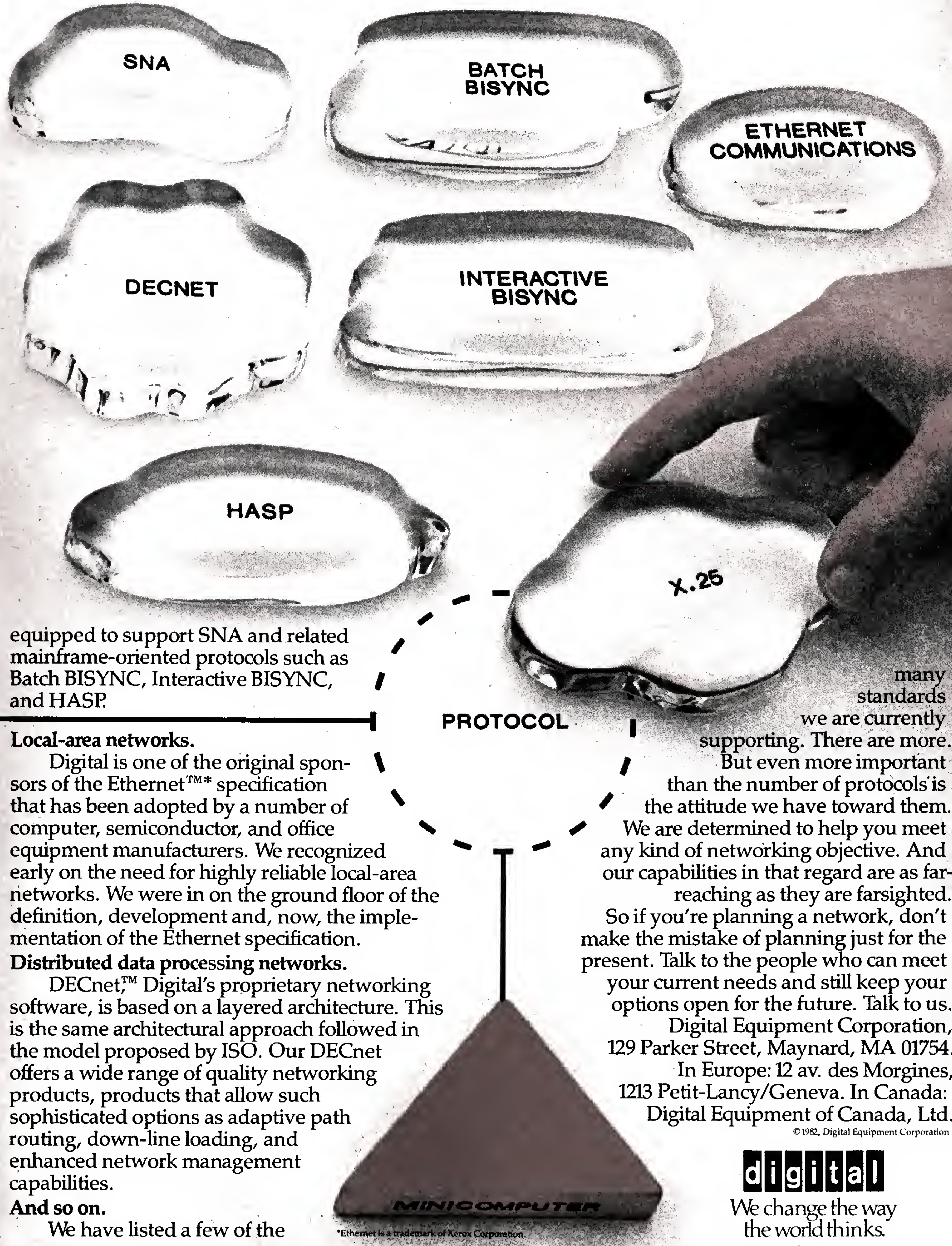
X.25 and other public networks.

Digital offers the X.25 protocol for use with public packet-switched networks such as Datapac (Canada), Transpac (France), and PSS (U.K.).

But when used with our computers, X.25 is much more than a simple link. We can provide you with the higher-level protocols that will take your systems beyond mere communications and into the sophisticated functionality that has made us a leader in networking software.

Hierarchical networks.

Even though we prefer to implement more flexible distributed networks, we are amply



equipped to support SNA and related mainframe-oriented protocols such as Batch BISYNC, Interactive BISYNC, and HASP.

Local-area networks.

Digital is one of the original sponsors of the Ethernet™* specification that has been adopted by a number of computer, semiconductor, and office equipment manufacturers. We recognized early on the need for highly reliable local-area networks. We were in on the ground floor of the definition, development and, now, the implementation of the Ethernet specification.

Distributed data processing networks.

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And so on.

We have listed a few of the many standards we are currently supporting. There are more. But even more important than the number of protocols is the attitude we have toward them. We are determined to help you meet any kind of networking objective. And our capabilities in that regard are as far-reaching as they are farsighted.

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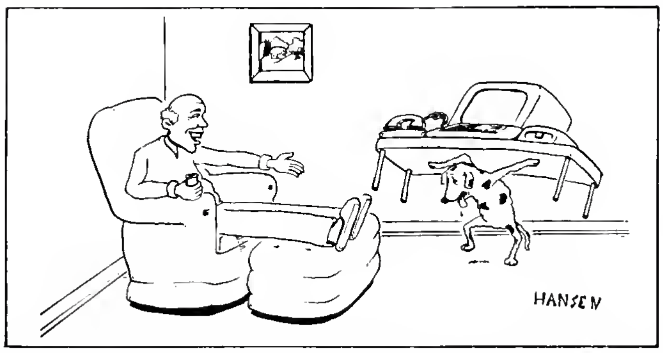

'Even Though It's Been Computerized, Good Old Spot Still Brings Me the Evening News.'

Key to Ideal Office of Future

(Continued from SR/11)

croprocessor-controlled communications processors offers a major alternative architecture — networking around the computers rather than through them. These processors make it possible to make more efficient use of rented transmission media, to off-load many routine communications functions from the CPU and to facilitate the use of computer and terminal equipment from a variety of vendors.

The rapidly improving price/performance ratio of these versatile processors will soon make them competitive with dedicated local networking schemes. Declining semiconductor prices give these components lower selling prices or increased function and performance at a given price.

Understanding networks and their evolution is key to understanding the impact of the most important networking element of the last five years — statistical multiplexers or data concentrators. Understanding begins with three fundamental laws: Networks never get smaller, never get slower and never stay the same.

It is difficult for network designers or managers to lay out a firm network for even three years. Their availability is frequently the impetus to create new uses. There is a basic understanding that networks are overloaded at installation and that flexibility and expandability are the most important functional requirements.

Networking Begins

Local networking usually begins when the first interactive or on-line application is installed. Terminals are connected to dedicated CPU ports. Strings of polled synchronous terminals may be connected to the computer via multidrop lines. Remote terminals that dial in to dedicated ports are added.

Then two things predictably happen: The computer runs out of ports and the telephone bills escalate.

Next to be acquired is a telephone rotary; the phone bill goes up again. A frequent next step is to reconfigure the network, adding one or more port selectors and pairs of multiplexers. Since most terminals are inactive much of the time, the multiplexers permit multiple terminals to share one phone line, which reduces phone costs and the number of modems.

This approach can frequently pay off in just a few months. A port selector allows users to be connected automatically to the first available port, as does the telephone rotary.

Adding More Links

Networks then expand by adding more independent links terminating in a central computer site. This then becomes a collection of individual networks, each of which must be managed independently. This, of course, is a giant step backward to the days of an operator sitting at an old-fashioned switchboard making voice connections.

Given this typical growth scenario for a network, it is

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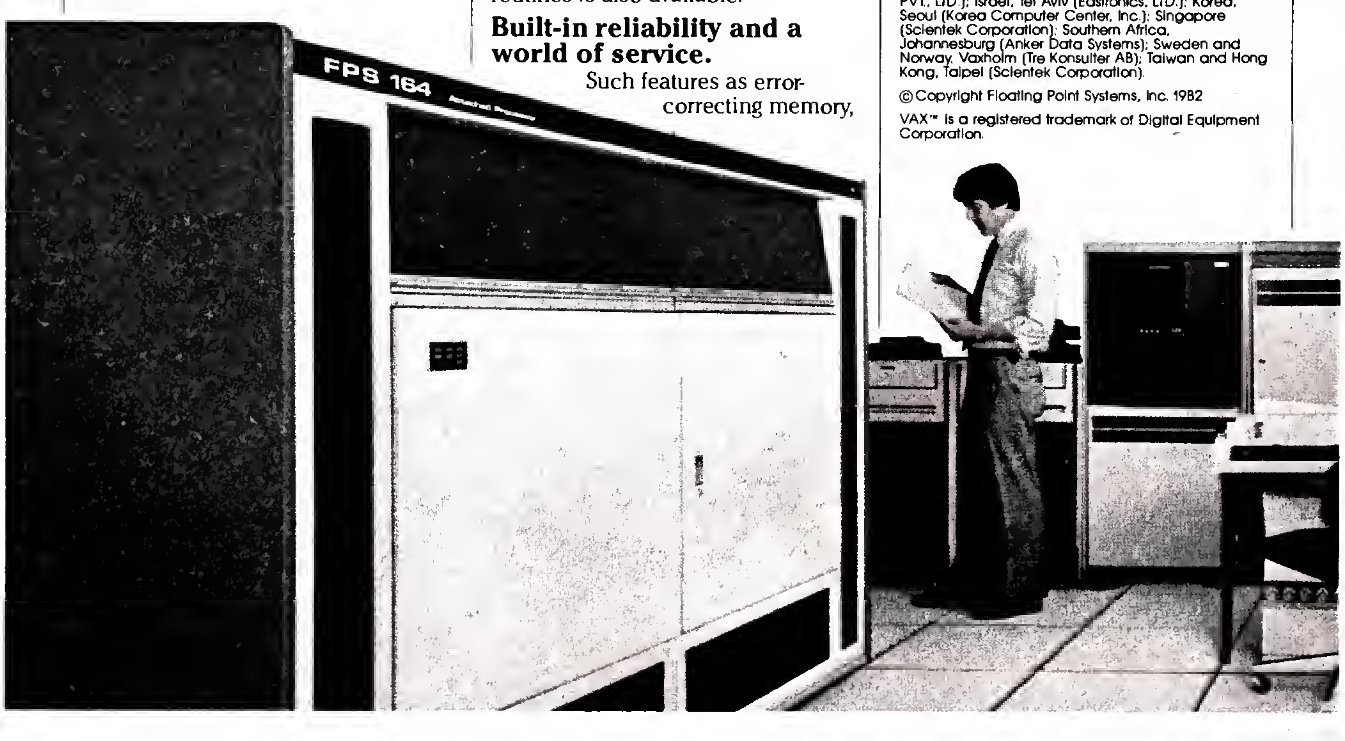

Found in Hybrid, Local Distributed Network

possible to understand the singular importance of the statistical multiplexer or data concentrator. The statistical multiplexer provides highly efficient utilization of telephone lines. These increasingly powerful, microprocessor-controlled units perform several other important functions, such as data link error correction; centralized fault diagnostics; speed, code and format conversions; and provision of operating statistics.

Standard statistical multiplexers function as packet switches with the destination address fixed, for example, a permanent virtual circuit (PVC) not under user control. Advanced switching statistical multiplexers are now available that permit terminal-addressed switching, elevating multiplexed data networks to the level of private packet nets.

In addition, some incorporate the functions of port contenders within the multiplexers.

In effect, these are private, automatic, data exchanges (PADX) providing the same types of value-added features for the data network that private automatic branch exchanges (PABX) permit for the voice user.

A difference is that data ports added to voice switches typically cost $1,000 or $1,200 per port, while switching multiplexers for data only typically sell for less than $300 per port.

Data Delays

Another difference is that much data can accept very long delays — up to many hours in the case of low priority electronic mail.

The ability to delay the data permits the use of lower cost transmission paths, with large buffer memories at either end providing a store-and-forward message service.

To the extent that this is possible, transmission costs can be substantially lower for data-only networks than in integrated voice-data systems. For these reasons, many users are now concluding that voice and data should generally be handled through separate networks. The ability to integrate local and distributed data networks has provided the final justification for this conclusion.

A Centralized Net

Using normal telephone wiring in-house and present or future common-carrier facilities for the distributed portion, an integrated network can provide the great advantage of totally centralized network management.

It also allows for the interconnection of almost any type of workstation or processor, without being tied to any single vendor.

Although there is seldom a single solution to any networking problem, this type of private packet network provides a low-cost, flexible solution that is being used in an increasing number of installations. It is available today.

Freeman is a product manager in the marketing department of Timeplex, Inc., based in Rochelle Park, N.J.

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GENERAL ELECTRIC

• *Goal to Prevent System Failure*

Components Need to Ensure Access, Integrity

By Sandy Metz
Special to CW‡

As organizations implement distributed data communications networks, availability and integrity of data across these networks become vital issues. Networking companies have tried to meet these requirements in a number of ways, but the most effective resolution is a totally integrated hardware/software design approach.

In such an approach, the computer system, operating system software and networking software are equally important and all are focused on a single goal: to create a data communications network in which there is no single point of failure that will bring down the network.

System availability in this context is both availability of on-line data and resources to users throughout a geographically dispersed network and reliability. Users want to know that their network, which manages, guides and controls critical business information, will continue to operate even if one or more components fail.

Data integrity is the quality and consistency of information stored in geographically distributed locations. Data integrity is important in any computer system, but even more so in a computer system network because the effects of bad data are far-reaching.

In an on-line transaction processing distributed network with distributed data bases, a single corrupted data element can ruin a data base throughout the entire network. Without transaction backout across a network, a data base can become contaminated if a single transaction cannot be completed.

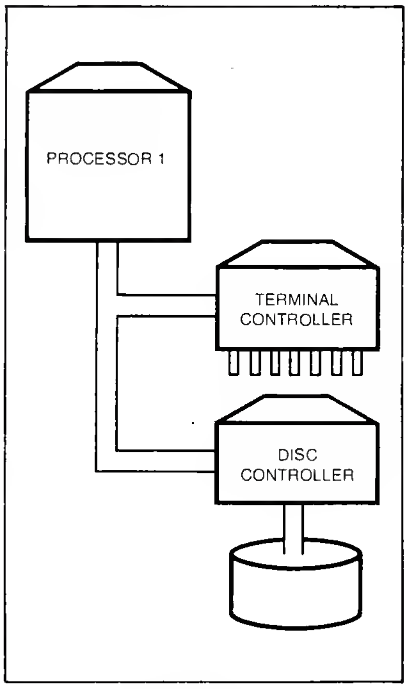


Figure 1

The first element in an integrated hardware/software computer system network is the computer system itself. To ensure continuous operation in a computer system, some vendors have tried to adapt existing hardware and software to accommodate dual processors. These systems usually require custom programming. However, they are very costly and frequently do not meet the need for continuous availability.

A more reliable approach, beginning with a single system and extending into a network of systems, is to design original hardware and operating system software to create a multiple-processor system that minimizes the risk of component failure.

This is the most effective way to provide continuous availability in a computer system. Designing hardware with no single point of failure, for example, will not accomplish continuous operation of the system or a network of systems unless the system and network software shares that characteristic.

In a typical mainframe computer system configuration, failure at any one of three points can stop the system (Figure 1). The processor and the

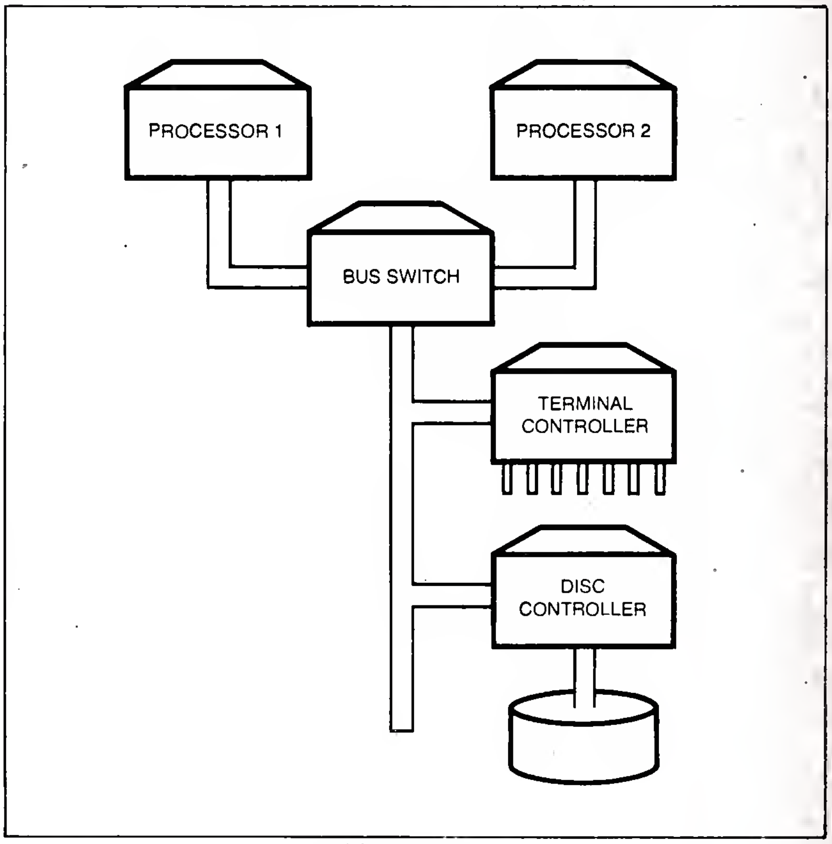


Figure 2

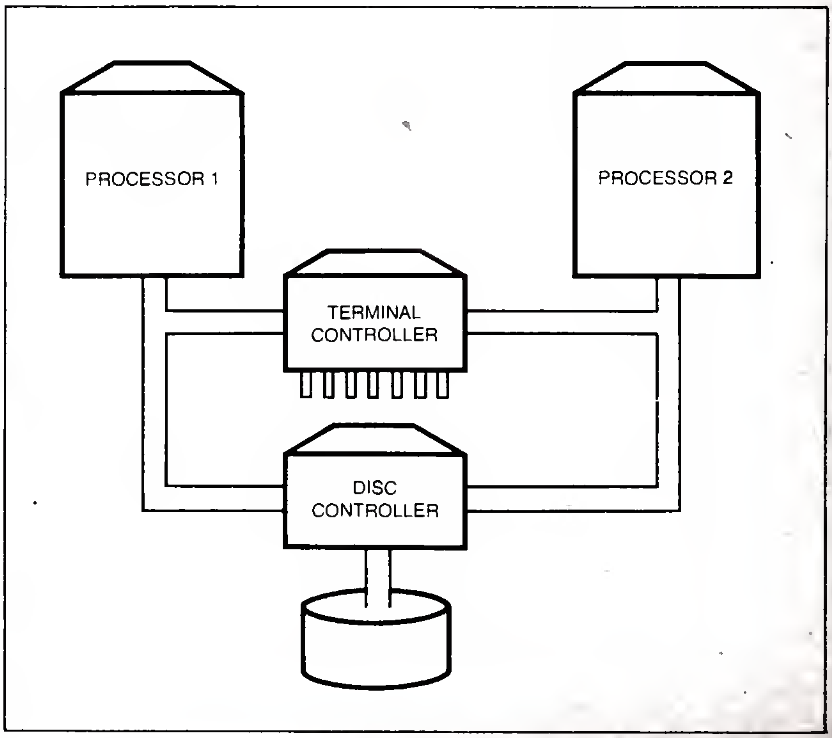
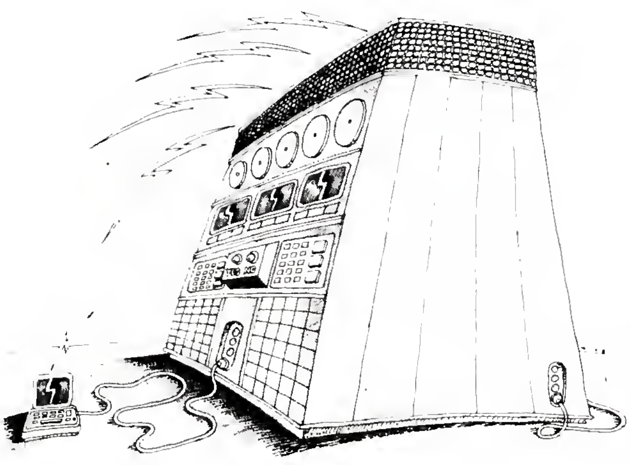


Figure 3



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Balancing Cost, Speed, Performance • in Integrated Hardware/Software Approach

I/O bus are obvious failure points. Not so obvious is the port logic of the controller. Peripherals are not considered a single point of failure because they can be duplicated. However, it is possible for one to fail and tie up the port logic in such a way that any traffic on the I/O bus is prevented.

A common solution to this problem is to duplicate the most visible and complex portion of the system — the processor (Figure 2). The addition of a processor and a bus switch creates a "hot backup" configuration. The bus switch accomplishes all I/O communications to the peripherals, eliminating the need to duplicate them.

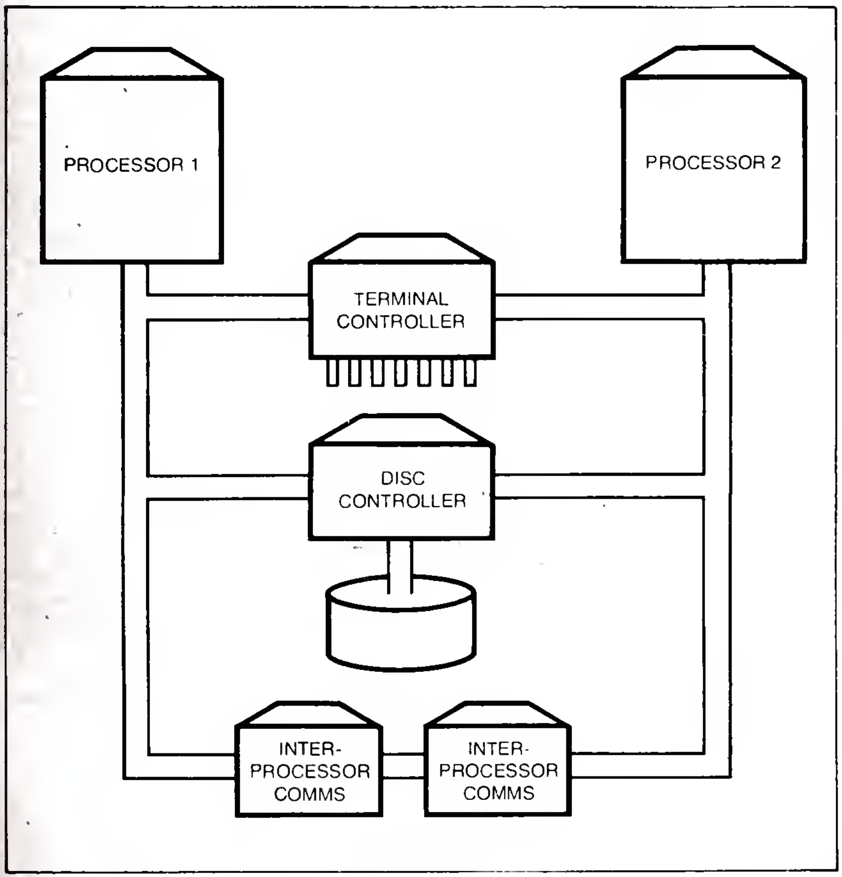

Figure 4

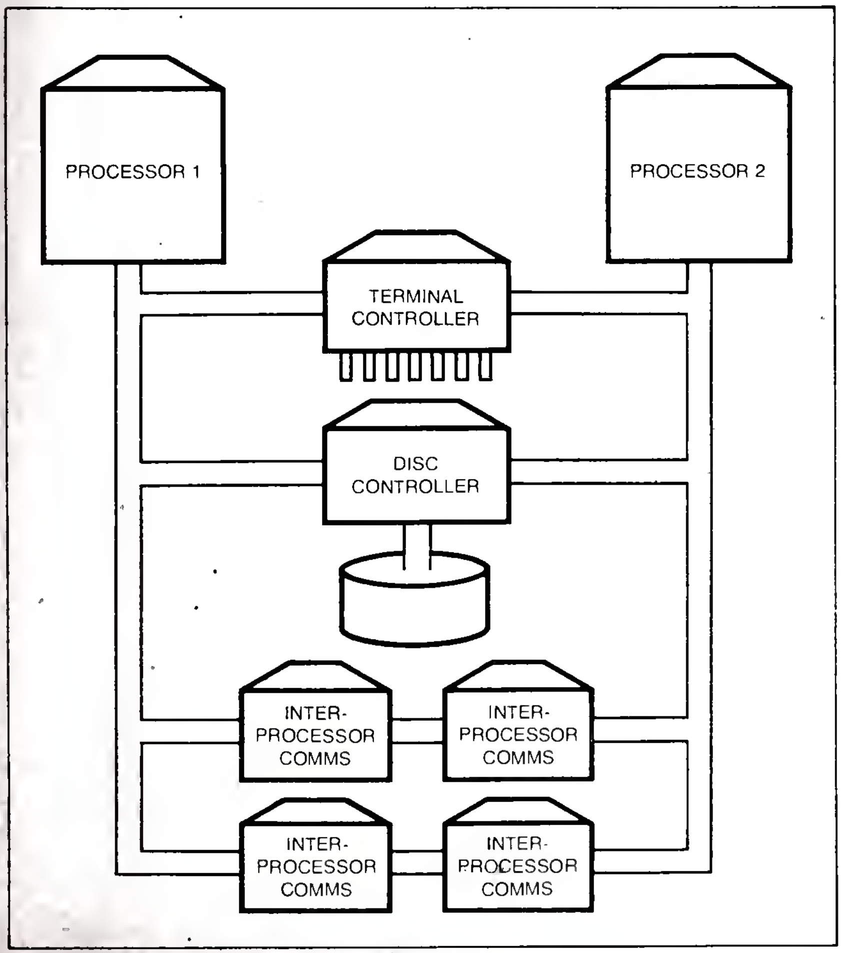

Figure 5

In this configuration, a second processor backs up the first and is started up in the event of a processor failure. However, this design still leaves three failure points: the bus switch, the I/O bus between the switch and the controllers and the port logic on the controller.

Because of the better mean time between failure rate of the bus switch, this system does provide higher availability. Unfortunately, this is more costly than other designs and does not achieve continuous availability.

The next logical step is to try removing the single bus switch (Figure 3). A dual-ported controller configuration is a system in which no single component failure will take down the system. If processor 1 fails, the job can be transferred to processor 2. If one I/O bus fails, there is an alternate path.

The drawback to this approach is it does not provide for interprocessor communications. Instead, processor 1 is forced to spool its active job out to disk, and processor 2 gets information from the disk. Total system performance is affected because disks are orders of magnitude slower than CPUs.

Common memory can be used to solve this performance problem, but it, too, is a single point of failure. In addition, common memory slows down the system because of memory contention.

Another approach to interprocessor communications is to have each processor module communicating via an I/O controller (Figure 4). One controller can be installed in each processor, providing a link between them so the two can talk to each other. This design also creates a single point of failure.

One way around this is to add another set of interprocessor communications modules (Figure 5). This could create a true continuous operation system with no obvious single failure points. With the proper software, it could provide everything — except decent system performance. Performance is hard to achieve in this configuration because of the increased traffic on the I/O buses.

If interprocessor communications is a design necessity, it makes sense to have the processors talk to each other via their own special communications link (Figure 6).

It is this interprocessor communications system that makes possible a reliable and continuously available network.

Separate Power Supply

Another addition to the design is a separate power supply for each processor and two power supplies for each I/O controller. This further ensures continuous operation by eliminating the risk of controller function because of a single power supply failure.

Since most systems were designed as uniprocessor systems, there is no system-level code for interprocessor communications. Instead, these systems employ two single-processor operating systems. The problem here is that an application program in one processor cannot talk to an application program in the other processor without additional system software.

The extra programming required to allow programs to talk to each other between processors is no small task. First, the software must support program-to-program routing, in which program 1 addresses program 2 via the program-to-program router and I/O drivers in processor 1, to the I/O drivers and program-to-program router resident in processor 2.

Metz works for Tandem Computers, Inc., based in Cupertino, Calif.

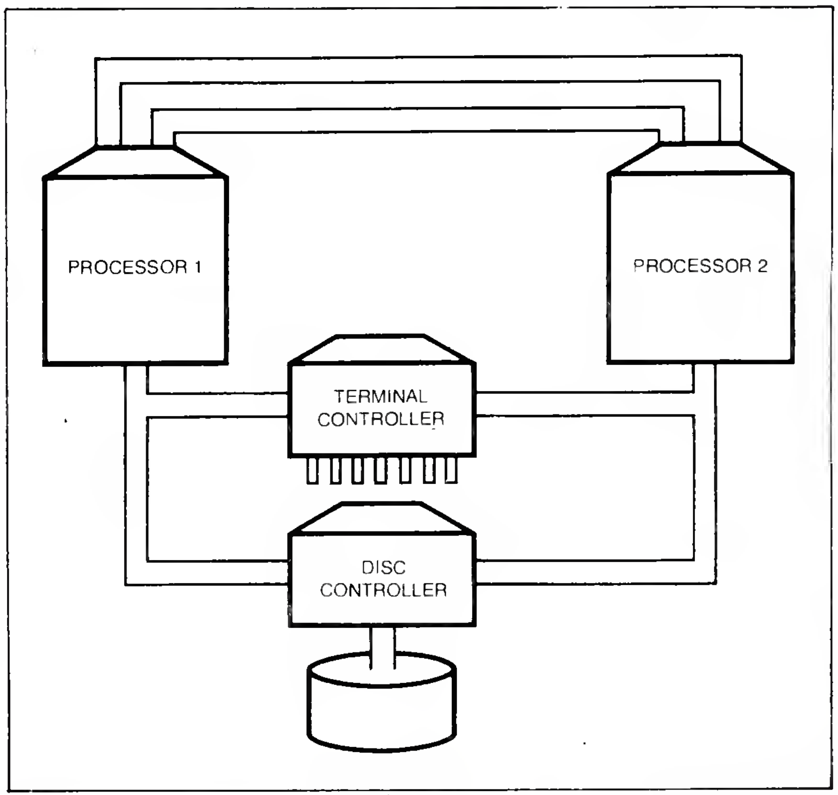

Figure 6

Leading Way to Local Computer Nets?

Ethernet's Success Lies Beyond OA Boundaries

By Bob Metcalfe

Special to CW‡

There is a tendency to bandy about the terms "local network," (local-area network) and "local computer network." In fact, they have very different characteristics. A local network does not imply electronic network. It could be nonelectronic such as the water-supply system to a building or air-conditioning system. A local computer network, on the other hand, is exclusively electronic.

Furthermore, it specifies the ability to directly connect hundreds of computers located hundreds of meters apart and to be capable of transferring digital data at hundreds of thousands of bit/sec.

In that context, Ethernet is a local computer network. It also gives rise to the second of two views on networking: the "Boxcentric" and "Ethercentric" views. The first view is described by drawing a box (representing a central system of some kind) and attaching lots of smaller boxes to it. Someone describing the Ethercentric view begins by drawing a line (the Ether) and attaching computer-based systems to it.

At present, the largest use for Ethernet local computer networks is for office automation. In that environment, Ethernet is used to support communications between intelligent workstations, the sharing of resources such as printers and disk files and a means for internetworking several local computer networks.

One of the issues impeding Ethernet's progress to its optimal application — namely the connection and communications between computers — is how best to attach a system to the network. For many existing systems, attachment via their RS-232 port and a conversion box is an expedient solution.

Over the long term, however, direct connection to the Ethernet is the most efficient and cost-effective method to employ. That means manufacturers will have to equip their products with a direct Ethernet interface.

Encouraging Its Use

By having made the Ethernet specifications public and inviting others to adopt the concept, Digital Equipment Corp., Intel Corp. and Xerox Corp. are encouraging its widespread use and popularity. This has also provided other companies with a blue print for products and components aimed at providing OEMs with direct Ethernet interface capability.

In less than two years since the publication of the DEC/Intel/Xerox Version 1.0 Ethernet specifications, Ethernet controllers have been designed and produced for interfacing computers with DEC's Q-bus, Xerox's Unibus, Intel's Multibus and S-100 industry standard system buses directly to Ethernet. And the cost of connection has been rapidly decreasing along with increases in progress and competition.

At one time, Ethernet was described as the office automation network. No mention was made about its usefulness in other applications. However, Intel has adopted Ethernet as the basis for its high-end engineering development systems network presaging a definite presence in the automated laboratory as well.

More than 20 companies in the U.S., Europe and Japan have announced products or intentions to develop products that are Ethernet-compatible. These include not only systems manufacturers, but integrated circuit makers and component companies.

The breadth and depth of that list indicates the growing popularity of Ethernet and the likelihood of Ethernet-compatible products for both end user and OEMs. At least companies have said publicly that they intend to be Ethernet-compatible.

These endorsements are significant as regards the issue of compatibility. The value of a system increases better than linearly if it is compatible with many other systems. This recognition, perhaps more than any other, is the driving force behind the effort to develop local computer network standards.

There has been a lot of controversy, misinformation and rumor concerning the developments taking place in various standards activities related to local computer networks. In fact, what had been described as a vast chasm of difference between the DEC/Intel/Xerox Ethernet and the carrier-sense multiple access with collision detecting proposal of the Institute of Electrical and Electronics Engineers (IEEE) has shrunk down to a barely perceptible difference. There is cause for optimism that by year's end, one will see the D-I-X Ethernet, the IEEE 802 proposal, that of European Computer Manufacturers' Association and that of the U.S. National Bureau of Standards become virtually the same.

Reaffirming Commitment

In February, Gordon Bell of DEC, Robert Noyce of Intel and David Liddle of Xerox appeared at a press seminar on the subject of Ethernet. Bell not only publicly reaffirmed DEC's commitment to Ethernet, but described it as the "Unibus of the next generation of computers."

Liddle talked about Xerox's installed base of Ethernet networks and mentioned that Ethernet was being used intrasystem in a copier to connect various subsystems together.

On a similar note, Noyce discussed applications for Ethernet integrated circuits in intrasystem designs. He

(Continued on SR/19)

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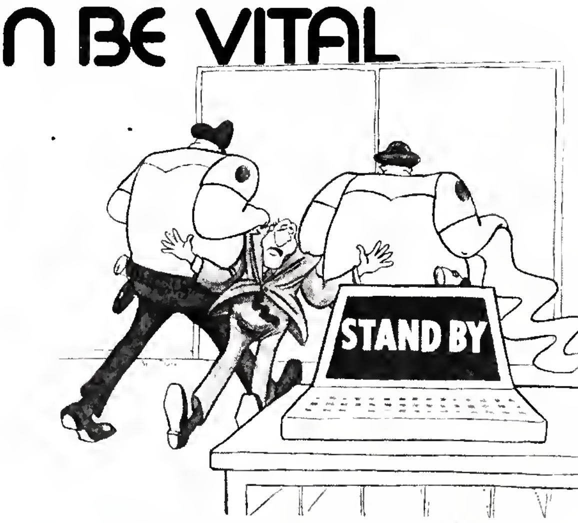

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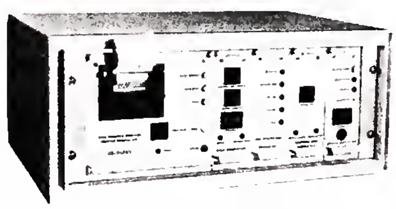

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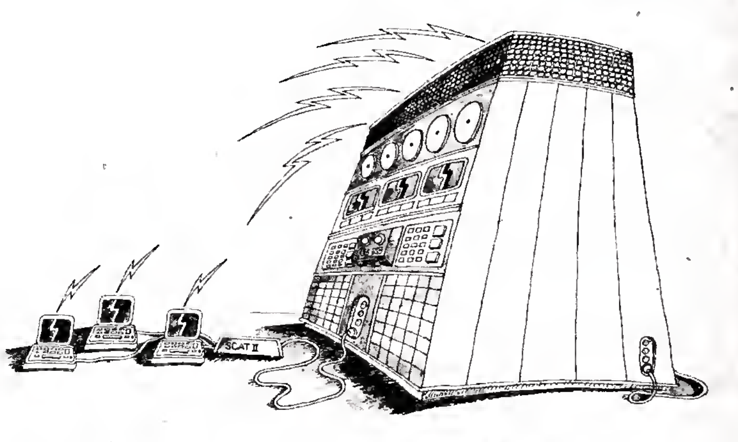

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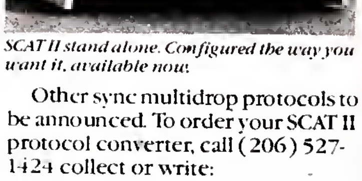

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T/S Net Teaches School Districts Fiscal Lesson

COLUMBUS, Ohio — A cooperative program implemented by public school districts in Ohio and the state's Department of Education is providing on-line, computerized financial management services through 27 locally operated time-sharing networks. Unique is the fact that not only are the 468 participating districts using a common standard for budgetary accounting and payroll services, but these systems are developed and supported by the department's Division of Computer Services and Statistical Reports.

Working with the office of the Auditor of State, which defines specifications for fiscally related processes, the division has written and supports the interactive software used by network sites. Division staff and Auditor of State personnel also conduct in-services for users in the utilization of the software and accounting procedures supported by it.

The 27 time-sharing systems, designated as Class A sites, provide interactive computer access to their member districts, designated as Class C sites, via telephone lines. Services of Class A sites are available 24 hours a day, seven days a week. Class C site users are equipped with CRT terminals and printers that permit them to process all transactions, produce all reports, check purchase orders and so on at their remote sites.

Dr. Franklin B. Walter, superintendent of public instruction, expressed his appreciation for the leadership shown by the Ohio General Assembly in appropriating funds to establish this network and in encouraging the degree of accountability it permits. Walter also envisions the computer network as a large step toward his commitment to reduce the reporting burden placed upon local school districts.

"By putting programming in place at the central Class A sites, which automatically generate state reporting data from management systems utilized daily by the local districts, districts need not file much of the financial reporting that was once required," he said. "In addition, we benefit by a savings of both time and money in that we receive the data in automated form and need not prepare it for use. We find the data to also be more accurate and timely."

According to William Phillis, assistant superintendent of public instruction, staffing at the Class A sites has also been held to a minimum. "The key is that we have centralized software development and support. The Class A sites need not compete for and employ expensive software development personnel in order to offer member districts a quality product," he said.

Harry Wolford, director of the Division of Computer Services and Statistical Reports, also indicated that his software development staff works closely with a committee of local business officials and treasurers in developing systems that are responsive to local needs. "Our staff does not pretend to fully understand fiscal management procedures required by local personnel. But we have been very successful in translating descriptions of such procedures provided by this committee into software systems which provide solutions," Wolford said.

Ethernet Jumps Beyond OA

(Continued from SR/18)

said the advantages of such an application are so many that he felt comfortable predicting that sales of Ethernet chips would rival those of the popular universal asynchronous receiver/transmitter chips.

Several integrated circuit manufacturers have announced their intentions to produce Ethernet integrated circuits. Today's controllers have been designed using off-the-shelf logic and/or general-purpose microprocessors. Despite that, the cost of controllers has come down to less than $1,000. 3Com Corp. is delivering its Multibus Ethernet controller for $840 in quantities of 25.

With the advent of inexpensive integrated circuit implementations, the cost for Ethernet attachment should continue its downward path. It is already at a point where manufacturers of personal computers can no longer justify looking elsewhere.

One event has yet to occur which should really drive the move to local computer networking. It was not until the advent of Visicorp's Visicalc that many potential users found what was for them a legitimate reason to purchase a personal computer. The advent of a Visicalc-like application — Visinet — that offers mass-appeal benefits could become, like Visicalc, the software that sells the local computer network.

Metcalfe is chairman of 3Com Corp. in Mountain View, Calif.

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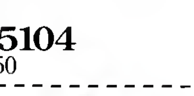

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Central Management Site for Users to Voice

By J.R. Leach
Special to CW‡

There is a confusion between network control systems and management systems. Network control systems are those technical tools that help communications personnel isolate and restore lines, modems, terminals and so forth.

A management system contains sufficient data to describe the entire network and organizes it into information used by the network management staff to manage the total network. How hard a system is to personalize by nonprogramming network personnel will determine its usability.

What follows is a specific philosophy for guiding product design:

Guiding Product Design

• *Centralized Network Management.* All user problems must be reported to a central management location, which must be ready to accept anything an end user considers a problem. Facilities within the management system must exist for prompt collection of any data that the user may provide on a problem. This dictates a flexible problem data collection capability and quick access to the problem file. A network control center of this type frequently manages customers in a large geographic area, so it is important for operators to have easy access to data relevant to the problem.

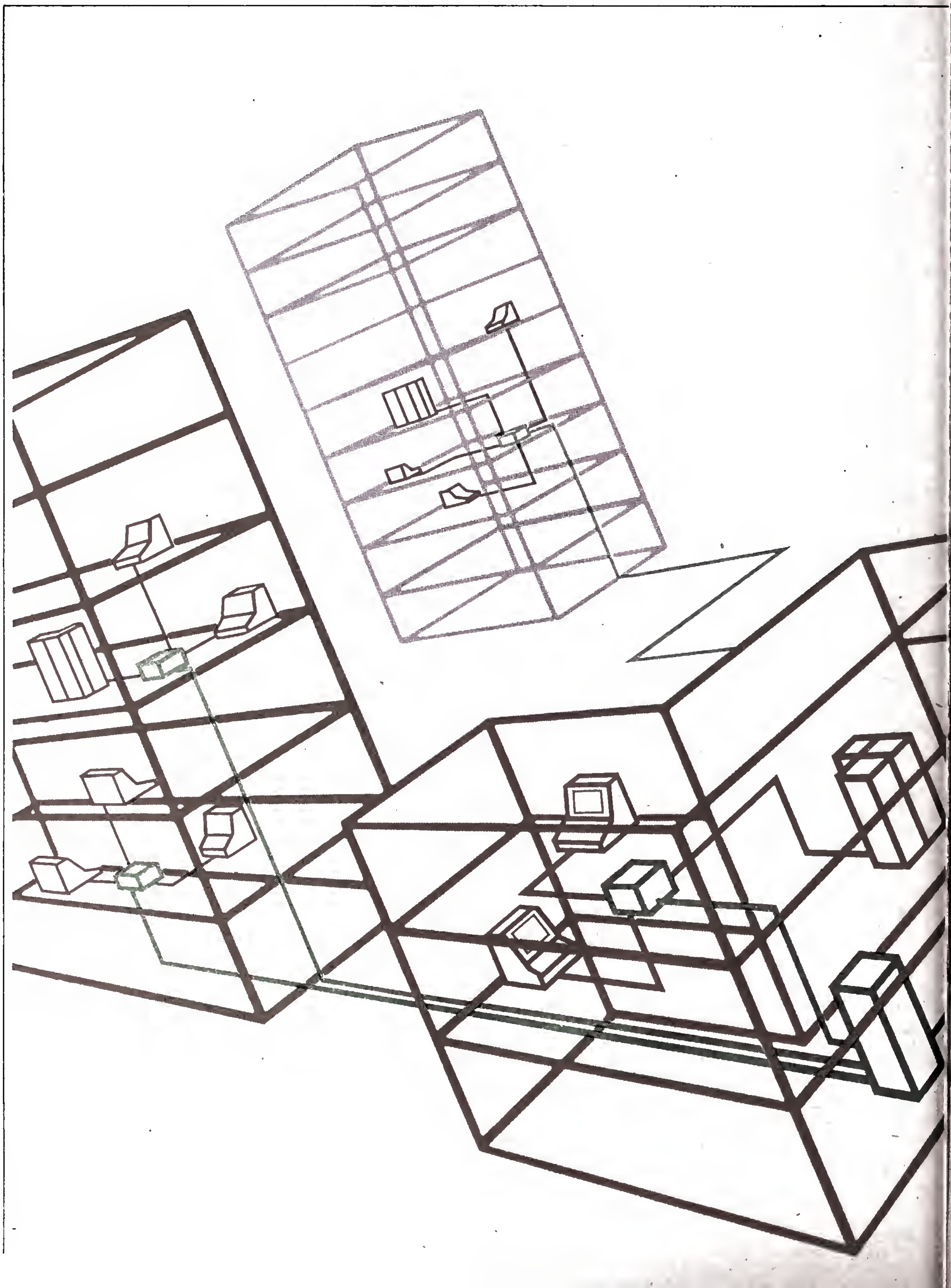
Many different techniques are available to collect problem data directly. These include intelligent modems, both in-band and out-of-band, intelligent control units and terminals and the front-end processor. Because of the technology and mix of products that most customers have installed, the user is still the primary source of problem recognition. Until automatic problem recognition is effective in the majority of products, the management of the network must support the user calling a control center to report a problem. Studies have shown that the "query-by-example" technique is the quickest and most accurate access method for data.

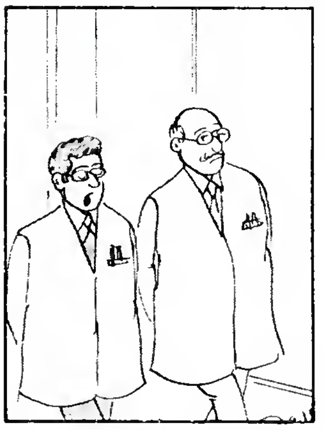
This is the method by which a format of the data is presented on the CRT screen to the operator. The user enters the known information. The system will display any record that matches the information entered. Query-by-example allows operators that may be unfamiliar with the data base rapid access to pertinent data.

The process of managing all problems from a central location minimizes communications difficulties and helps solve problems that may otherwise pass unnoticed.

• *Comprehensive Component Management.* A communications network is a complex of related system components. A component is anything that may adversely affect the end user through malfunction. Therefore, terminals, modems, lines, multiplexers, CPU complex, storage devices, system software and applications software are all included as system components. A failure of any of these facilities will cause a disruption to the end users.

• *Single Data Base.* The net-





'That New Computer Works Fine, But It Keeps Repeating Itself, Repeating Itself, Repeating Itself...'

Problems Vital Step in Guiding Product Design

work management facility must maintain a data base reflecting the current state of the communications system including all problems and vendor assignments. This requirement dictates that the data base may be updated, including file keys, while it is being used. However, security must be at the record level. In addition, the security access to a record through one key does not mean that the operator should have access to the same record by using another key.

- *User Advocate*. The attitude of management and people who work in the control center must be that of a user advocate as opposed to that of a network-control advocate. Users must encounter a friendly and helpful attitude or they will refuse to use the center.
- *Communications System Management Center*. The focal point at which all user problems are reported and managed is the communications system management center or user-help facility. Management center personnel must understand the operation of the end user's installations and possess good verbal communications skills.

The responsibility to log the reported problem and perform first-level problem determination belongs to the user-help operator. If not, the operator's responsibility is to complete first-level problem determination and assign the problem to a "problem resolver." All problems must be assigned to a problem resolver.

If the problem resolver is not known, the problem must be assigned to the next most technical function holder (for example, Vtam systems programmer) to determine who is the problem resolver, while the operator completes problem determination.

Tracking the Problem

The user-help operator has the responsibility of tracking the problem until it is fixed by the problem resolver, who ordinarily will be the vendor of the faulty component. The vendor may also be an "internal" vendor, such as an applications programmer. Problems fall into two categories:

- Major facility loss, with immediate and drastic curtailment of network capability.
- Minor facility malfunction that has little immediate consequence but contributes to a long-term degradation of network performance.

Loss of a major facility such as the outage of a telephone line or CPU is well understood. People in the organization usually have experience managing these major outages. What is often ignored are the minor irritant-type problems that collectively contribute to end-user service degradation. If these minor problems are not promptly corrected, it usually takes as long to solve the problems as it took for them to develop.

First Rule

The overall effectiveness of the management system is dependent on the first rule of software systems: A system must be easier to use than the alternative it replaces. If the requirement discussed here is not satisfied, the implementation method is not relevant.

For any method to be effective, it must be easy to use, user-definable at all levels (including menu flow) and have on-line data maintenance. This simply means that people using the data must be able to maintain it while they use it (given the proper security level). Given these facilities, effective management of a network is possible and cost-effective.

Leach is president of Peregrine Systems, Inc., which is based in Irvine, Calif.

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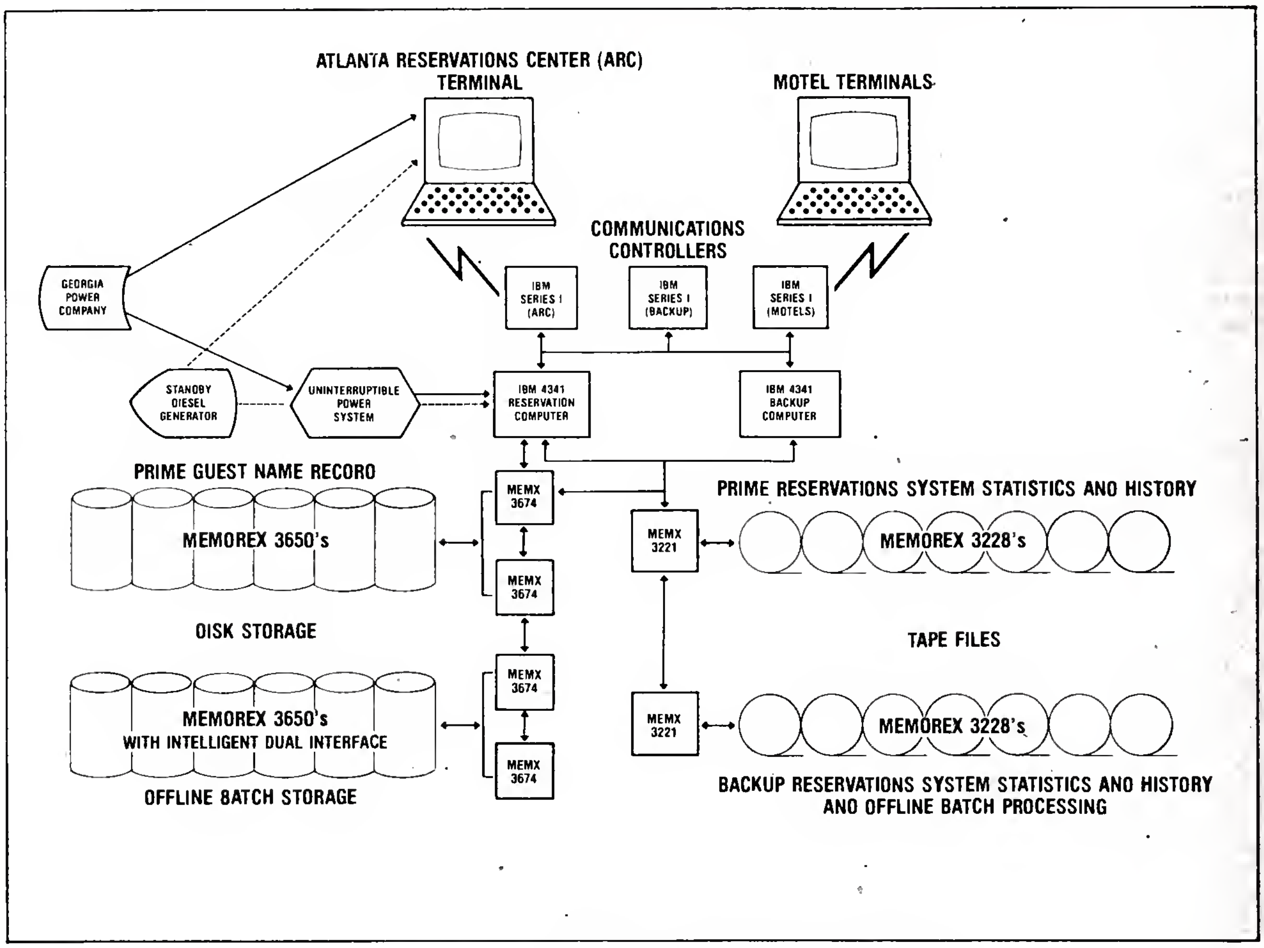

The Days Inn Reservations System

ATLANTA — Since it installed an in-house reservations system last year, Days Inns of America, Inc., the sixth largest motel chain in the nation, has slashed 50% off the cost of transmitting reservations and has reduced training time from days to hours. It has also cut error-risk and established an advanced communications link that is saving more than $10,000 per month in long-distance telephone charges, the company reported.

All this was achieved with a virtually flawless start-up when the fast-growing chain switched from a service bureau to an in-house system and unique software. According to Woody Hanson, vice-president of management information systems, the system has been trouble-free since it began running last December on a daily volume of over 100,000 formatted transactions. Uptime has been highly efficient as well — now at 99.97% per 23-hour, 55-minute day.

At the heart of the operation are two IBM 4341s, three Series 1 communications controllers, 36 spindles of Memorex Corp. 3650 disk drives, four Memorex 3674 system control units and 14 Memorex 3228 tape drives.

A Room for All Seasons

The new system blends highly reliable hardware with innovative software designed by Days Inns' staff to enhance the Programmed Airlines Reservations System (Pars). An industry standard, Pars requires the use of memorized codes. The hotel business is seasonal, however, and relies on part-time, inexperienced personnel during peak periods. Since training short-term staff on the Pars system is expensive, Days Inns' software incorporates some ingenious human engineering features to solve this problem.

Before Days Inns modified Pars, the system required coded inputs that called for lengthy training sessions. To enter a reservation, for example, the guest's name had to be preceded by N, the phone number by P and other entries by other codes. A minor error — such as a blank instead of a slash — caused data rejection. Days Inns' new system eliminates codes entirely.

Using a menu-driven format on the new user-friendly system, the operator simply replies to fill-in-the-blank questions flashed on the terminal screen. All further data breakdown is automatic, and the computer sends back to the operator an immediate response confirming the room reservation or cancellation. Training on the CRT terminal has been decreased from four days to two hours, and errors have now become extremely rare.

To fill more than 44,000 rooms in 316 motels across the U.S. and Canada, the Atlanta-based budget chain relies heavily on its telephone reservations system. In fact, the call volume per motel is reputed to be the highest in the industry.

Managing Over Distances

The guest reservations data base plays a major role in enabling Days Inns to manage its local facilities on a daily basis. According to Hanson, most other hotel and motel chains are run primarily as franchises. Days Inns is unusual in its ownership of more than 40% of its properties, and this presents the challenge of managing the operations over long distances.

Here the computer is crucial. "By this fall, modifications will be in place to use our reservations terminals to capture daily operating data for the motels, restaurants and gas stations at each of the 130 locations across the country. This will be processed in Atlanta overnight and we will know the next morning how we did nationwide the previous day," Hanson said.

In addition, the chain's Atlanta headquarters can monitor through telephone lines the performance of

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Reservations System

the new terminal equipment installed at each motel. The communications link makes it possible to diagnose problems long distance and advise the motel manager to send the malfunctioning component to Atlanta for repair.

Once a reservation is made, the computer schedules its transmission to the appropriate motel, storing messages that can wait for periods when long-distance communications line costs are lower. Savings in line charges have reached $10,000 a month during the slower season and are expected to be substantially greater during the peak summer months.

The system is flexible enough to handle all the company's other data processing requirements as well, including payroll, personnel, accounting and modeling/planning. It can also be modified to allow communication with airlines, car rental agencies and others.

Recently, Days Inns merged its affiliate companies into Days Inns of America, Inc., a restructuring that involved all accounting functions, five payrolls and more than 6,000 employees. With DP operations moved in-house and with the high reliability of its hardware, Days Inns' transition has been faster and more efficient than would have been possible with a service bureau, according to Hanson.

Fail-Safe Support

Even the best system configuration is subject to the unexpected, and Days Inns' solution is the full duplication of its hardware to assure continuity in the event of a major malfunction.

As shown on the accompanying diagram (see Figure on SR/22), the reservations system can be supported by either of the two mainframes, and there is full communications backup should one of the controllers fail. There are also two independent strings of single-density Memorex 3650 disk drives, resulting in unusually high availability.

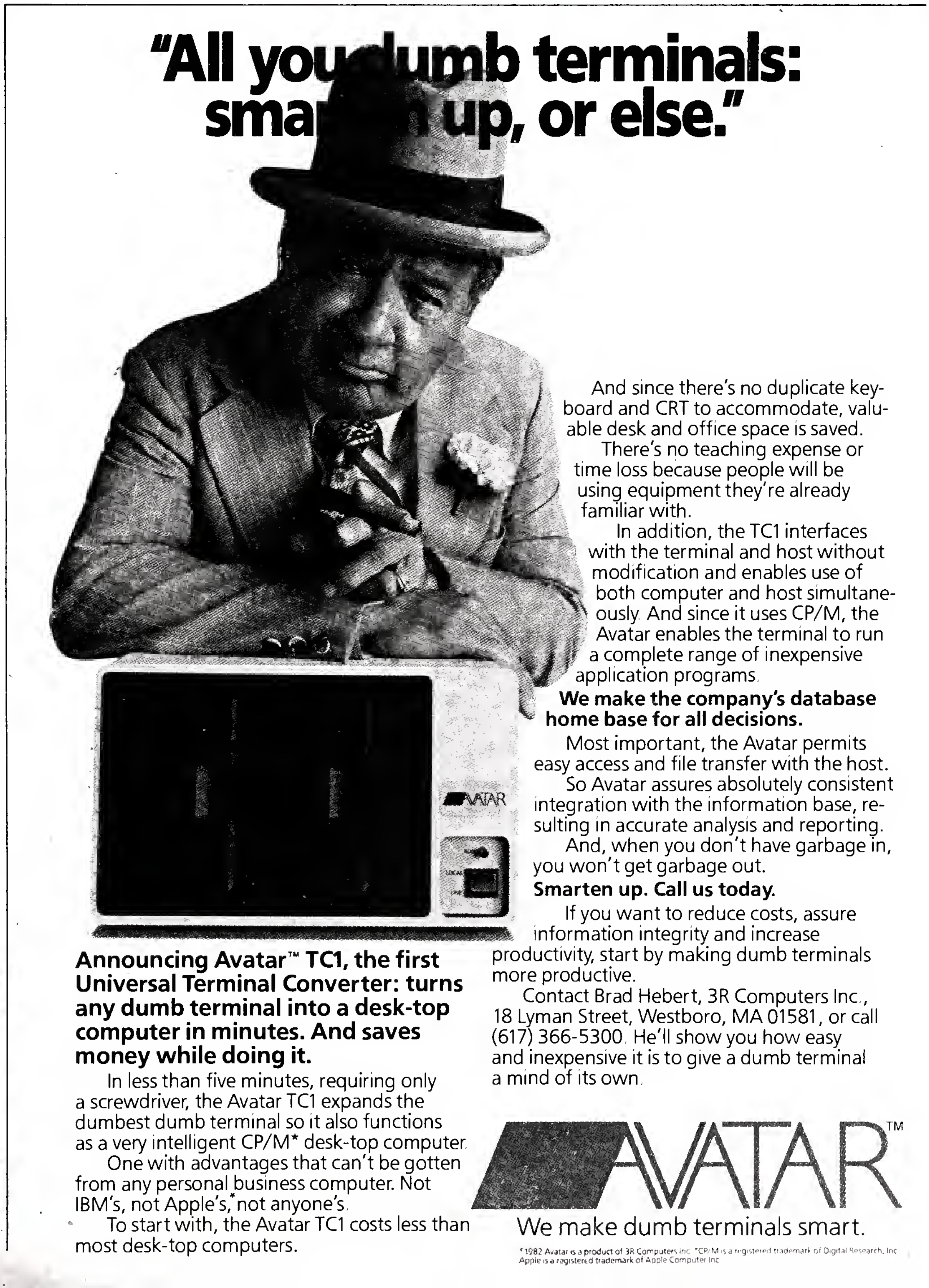
To protect against data loss, even in a catastrophe, a complete backup of the reservations system is taped nightly and stored in a secure area. Disk data records are duplicated within the system.

The equipment is linked to the "Days Innformation" Reservations Center, a modern 18,000-sq-ft facility in which 130 reservationists receive telephone calls over a toll-free 800 number. The center receives an average of 325,000 reservations calls per month.

Using CRT terminals to communicate with the computer, reservations agents transmit booking and administrative information to the motels. Each motel is equipped with a 32K-byte random-access memory, downline loadable controller, CRT terminal and a receive-only terminal. The intelligence at the field is used to edit information before it is transmitted to Atlanta, further enhancing the use of the communications network and economizing on the lodging chain's long-distance telephone and mail costs.

The 'Days Innformation' reservations center in Atlanta receives some 325,000 calls each month.

Days Inn's computer center systems availability logged at 99.97%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Packet Radio Networking Technology Seen as

By Barry M. Leiner,
Keith S. Klemba
And Janet D. Tornow
Special to CW‡

Packet radio networking (PRNET) technology — now under development by SRI International, Inc.; Collins Radio Group of Rockwell International Corp.; and Bolt Beranek and Newman, Inc. under contract to the Defense Advanced Research Projects Agency (Darpa) — combines the advantages of packet switching with those of spread-spectrum broadcast radio.

It provides a highly reliable, efficient way of supporting computer communications to a large number and variety of mobile users through the sharing of a single multiple-access radio channel.

In addition, it has the capability of intercommunicating with other networks, thus providing remote mobile access to many central computers worldwide.

PRNET Characterisitics

Four characteristics and innovative capabilities of PRNET include:

- *Packet Switching*. In a packet-switched network, the input flow of information is divided into discrete packets. PRNET packets are of variable length, up to a maximum of 2112 bits. Each packet consists of a preamble to acquire radio receiver synchronization, a header to define packet handling, the data and a cyclic redundancy checksum (CRC) for error detection.

Use of the CRC results in a probability of an undetected packet error of one in a trillion, which makes the PRNET an extremely reliable computer data link.

A packet is a natural unit of communications for computers in which a short burst of data is sent or received, followed by a longer quiescent interval.

Through the use of variable-size packets, each user consumes only as much of the communications resources as necessary to perform his task.

Multihop radio forwarding allows a packet to travel from node to node through the network based on addressing information contained in its header. Each node directs the packet to the next node and dynamically accesses the necessary network resources to facilitate the transmission of the packet.

Thus, each packet is independently stored and forwarded through the network along a point-to-point path from the source to the destination. No attempt is ever made to schedule transmission over the entire source-destination path. This increases resource efficiency and network performance in several ways.

- *Single Channel*. Packet communications is based on the idea that resources are allocated to one user for a short period of time.

In the PRNET, all users share a single spread-spectrum L-band channel having a radio frequency bandwidth of 20 MHz. A single-channel system allows flexible adjustment to channel capacity as the traffic flow fa-

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Efficient Way of Reaching Host of Mobile Users

vors either inbound or outbound traffic, permits identical receivers throughout the system and simplifies the acknowledgment process.

Transmission rates of 100K or 400K bit/sec can be used, the slower rate being most appropriate for adverse radio signal propagation conditions.

Dynamic sharing of a single channel increases the probability of using the local radio channel effectively in the presence of bursty and variable loading. This concept is known as statistical load averaging.

PRNET handles common channel access problems by using an asynchronous multiple-access technique known as carrier-sense multiple access (CSMA). In the CSMA mode, nodes listen before they talk. If the channel is busy, the node waits a random time and then tries again.

- *Spread Spectrum Broadcast Radio.* All packet radios in PRNETs use omnidirectional antennas. Therefore a signal broadcast by a transmitting packet radio may be received over a wide area by any number of receivers, enabling multiple neighboring packet radios to simultaneously receive a single transmission.

This inherent quality of broadcasting offers an ease, flexibility and robustness of route and alternate-route assignments for packets making their way toward a destination through areas of changing radio connectivity.

The broadcasting feature of a packet radio network also greatly simplifies topological design and wide geographical coverage, which may both be extremely complex with wire networks.

Furthermore, the broadcasting feature, together with appropriate network management procedures, permits rapid deployment (no wires or point-to-point microwave link to set up) and allows the PRNET to be expanded or contracted automatically and dynamically.

The choice of spread-spectrum waveforms for the PRNET was largely motivated by its various performance attributes: the possibility of multiuser coexistence on the heavily allocated UHF and VHF frequency bands, a reduction in the signaling limitation caused by multipath and its antijamming and anti-intercept capabilities in tactical applications.

There are several types of spread-spectrum waveform. The PRNET uses direct sequence pseudo-noise modulation.

- *Network Management.* The PRNET features fully automated network management. It is self-configuring upon network initialization, reconfigures upon gain or loss of nodes, has dynamic alternate routing and is transparent to the user.

Effective network management begins with link monitoring. This includes both communications and measurements. After transmitting a packet, a node awaits an acknowledgment from the next node along the route.

If the transmitting node has not heard the acknowledgment within a certain time interval, it retransmits the packet. Retransmission occurs a set number of times until the node gives up and notes the link as being of bad quality. (This is known as a hop-by-hop acknowledgment scheme).

The nodes also gather link-quality information by the use of special packets. These packets measure congestion and signal strength. All this link data is accumulated and smoothed by the node.

The node then forwards summary status-reporting packets to the network control members known as stations.

These packets are generated

(Continued on SR/30)

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CW 9/27

National Advanced Systems

Packet Radio Net: Technology's Live Wire?

(Continued from SR/27)

to keep stations apprised of the nodes' conditions and of any problems that occur in the process of forwarding traffic. They may relay local connectivity, a route loss, a change in the link quality of a neighboring node or the existence of a neighbor unknown to the station.

Stations use this connectivity information to select optimal routes through the network and to distribute these routes to the nodes.

In the event of route failure, the nodes request a new route from the station and alternate routing takes place automatically and simultaneously.

Of major importance in network control is the assurance that the traffic used to control the subnet be reliably transported with a high priority.

Packets capable of alleviating congestion upon reaching their destination should not be bogged down or lost in the same congestion. All control traffic within the PRNET is based on a reliable end-to-end protocol optimized specifically for the PRNET.

Network Components

The making of a PRNET calls for a collection of nodes (intelligent switches) that communicate with one another via local broadcast radio.

Each node in the PRNET contains, as a common element, an intelligent store-and-forward switch, the packet radio. Each packet radio contains an L-band spread-spectrum radio unit, a digital unit and an omnidirectional antenna.

Packet radios are responsible for relaying messages (with appropriate routing, acknowledgments, error and flow control, queuing and so on). Packet radios are deployed as necessary to provide extended area coverage.

Multiple redundant stations provide control for the PRNET. A station is connected to a packet radio.

Stations are capable of continually assessing network conditions and managing the network to offer users the best possible service. In order to minimize control traffic, packet radio cost and complexity, routes are assigned by the stations.

Route Selection

The route selection is made primarily to assign efficient routes and secondarily to distribute traffic flow more uniformly across the network.

The PRNET's current implementation of multistation control (multiple stations deployed at different sites within the network with coordination between the stations) and backup stationless control (packet radios using accumulated link-level information to provide routing) provides continued operation despite a failure of one or more stations.

The network may be accessed at any node by connecting to the packet radios. User messages originate and terminate at such nodes.

Leiner is program manager at Darpa. Lemba is a research engineer and Tornow is an operations analyst, both at SRI International, based in Menlo Park, Calif.

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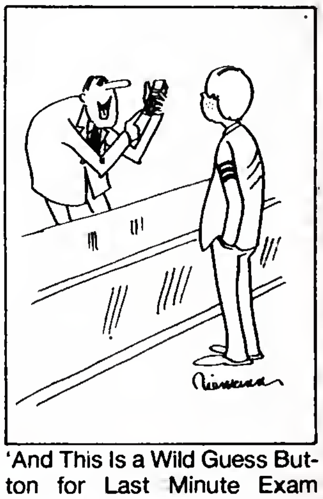

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Protocols Are DP Industry's Missing Link

By Gary F. Toelle
Special to CW‡

There are several different definitions of the word "protocol" used in the field of data communications today. One formal definition is: "A set of conventions or rules governing the format and timing of message exchanges to control data movements and correct errors. It is important to ensure that the protocol is valid, makes sense, works and is adhered to by all users of the network in question."

This article will use a slightly broader definition of the term protocol: "the rules governing the interfacing, whether electrical, mechanical or procedural in nature, which enable the transmission of useful information from one communications device to another in an intelligible manner."

Nowhere is the difference between protocols more pronounced than in the DP industry. In this industry it is possible not only for equipment supplied by different vendors to not interface (that is, not communicate with one another), but it is also quite common to find that data communications equipment supplied by a single vendor is not compatible with equipment of another series supplied by the same vendor.

The lack of a commonality of protocols was not of paramount concern to the designers of early communications systems, because then so few systems existed. Those that did exist were usually not expected to be able to interface with other systems anyway.

It was therefore possible for the designers of those early systems to specify components that were compatible only with the protocol of their own particular system. When it was necessary to interface systems with differing protocols, the usual solution was to produce a "hard copy" of the message from the incoming system, then manually reenter that information into the outgoing system(s).

Torn-Paper-Tape Switching

One implementation of this technique was known as torn-paper-tape switching. This method was so-named because the message from the first system was punched into a paper tape that was then torn off, physically carried over to the input device (a paper-tape reader) for the second system, then entered into that system for retransmission.

The lack of standardization of protocols found in the various brands of equipment limited the designer's choice of equipment. It also made it virtually impossible to implement systems made up of equipment supplied by different vendors. These two problems were not considered critical because, although they did make life more difficult for the system designers, they did not completely stop the development of new systems or the expansion of existing ones.

In addition, even until just a few years ago, there were only a few data communications systems in use, so the problems interested only a very small segment of the business.

Communications protocols are relevant in three main areas of network design: communications within a particular hardware and software configuration (that is, within a specific physical computer system and its associated applications); within the computer configuration located at the other end of the communications link; and within the communications link itself.

The protocol within the first (that is, the local) system is usually defined in large part by the hardware vendor. That portion of the system that is not defined by the vendor is "filled in" by the designer who writes specifications for the software, which will run on the local system. This software is usually built from the various tools supplied either by the vendor or by a separate software source. The software is usually written to enable use of "hooks" in the vendor-supplied hardware and software.

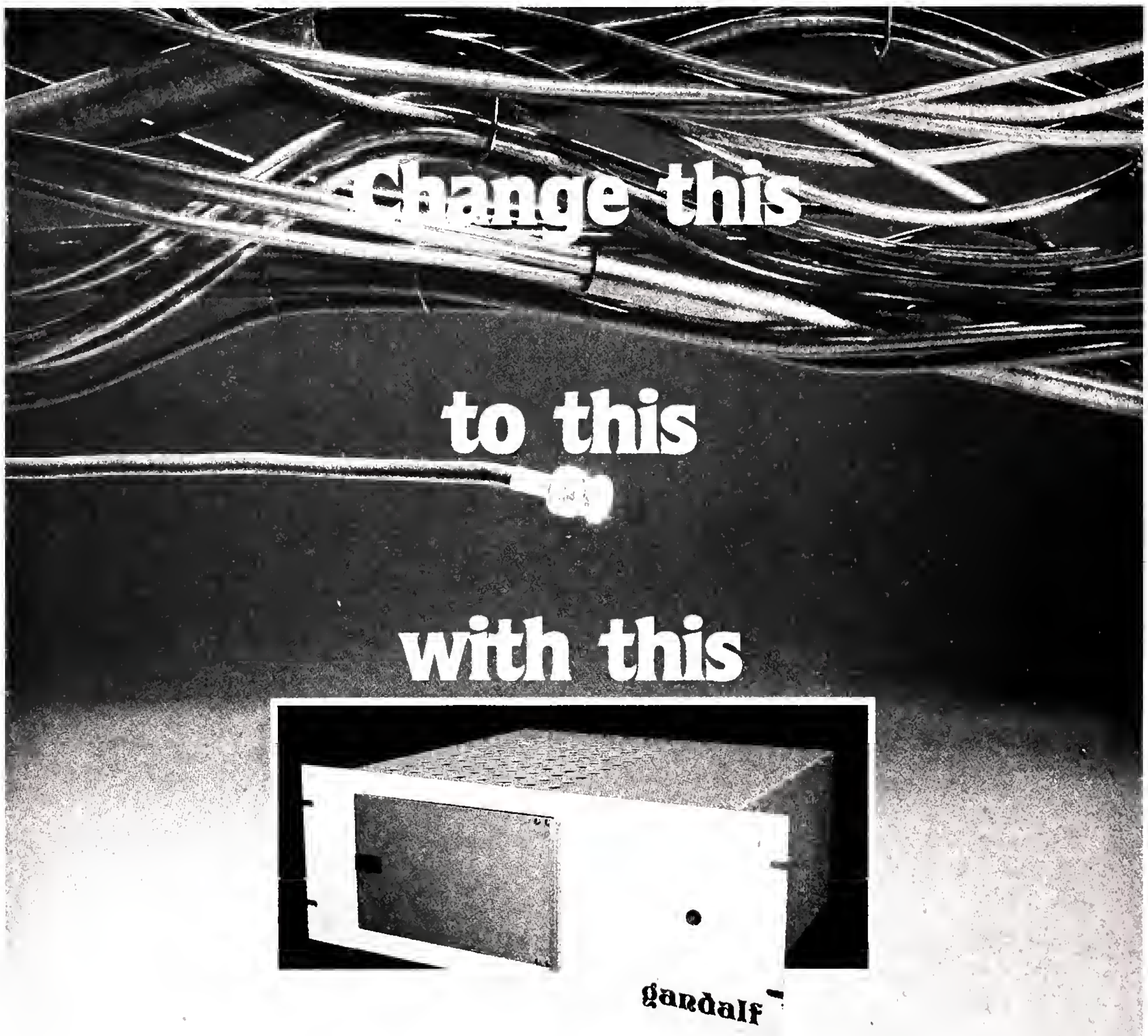
The second area, the external system, consists of hardware and software located at the other end of the communications link.

This system can consist of a single physical system, or it may be made up of several systems located at one or more sites that are remote to the location of the local system. As with the local system, the basic hardware and software protocols used in the "external" system(s) are defined and provided by the manufacturers of the equipment used in the system(s).

Additions to the architecture that are not supplied by the hardware vendor(s) must be provided by those who design and build the application systems that are to be run on the equipment.

The third area is the interconnection between the local system and

(Continued on SR/34)



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DP Services Open New Markets

Vendor-Supplied Net Brings Banking Home

KNOXVILLE, Tenn. — "The home-banking concept is now catching on all over the country," according to Forrest Martin, Financial Interstate Service Corp.'s (Fisc) director of research and development. A vendor-supplied data communications network is helping Fisc provide its banking clients with DP services that are opening new markets among home and small-business computer users.

Fisc announced Bank-at-Home and Business-Manager products in October 1980 to make use of the value-added communications network of Compuserve Network Services (CNS), a division of Compuserve, Inc. of Columbus, Ohio, and to bring large-bank benefits and privileges to customers at home and in small businesses.

Integral to these systems is the CNS network, according to Martin. "The trend in banking has been a movement toward the home," he says. "We couldn't afford to run leased lines to people's homes, so we needed a network vendor who was an expert in the field, and who could provide the most user-friendly and reliable system possible.

"The menu-driven Compuserve design is so effective we incorporated it into our own product architecture, so network access is available to users even when they are deep into their bank-service menus, and user-friendliness is extremely important because the new services are typically going to true first-time users," Martin said.

Fisc is a privately run company that until four years ago was the DP services department of the United American Bank of Knoxville — today the largest bank in Knoxville with assets of about $750 million. Fisc now provides DP services to United American Bank, as well as to 40 other banks from Tennessee and Kentucky to Massachusetts and is adding new "conversions" at the rate of about five bank applications per month, according to Martin.

Geared to Smaller Banks

"Although we have some large-bank customers, our services are primarily geared to helping smaller banks sell competitive DP products even though they can't afford elaborate in-house systems," Martin said. "Our central DP system includes IBM 3031 and IBM 4341-II mainframes. We offer extensive automated teller machine (ATM) and cash-dispensing-machine networks where banks can share ATM use with other banks on our network, and we've pioneered some powerful custom terminals that put technology to work on behalf of smaller banks such as a customer-activated statement machine,

"In fact, the trend has always been toward home-type convenience banking," he said. "Twenty years ago banks went from centralized to branch operations, then to drive-up windows, then ATMs and now to home-banking services like automatic bill payment, funds transfer and account-checking applications, along with access to commercial information-type data bases that are also available through a time-share network.

"We are experts at bank DP, but to implement our Bank-at-Home and Business Manager services we knew we needed a network vendor who was expert at bringing data into the home and that turned out to be Compuserve," Martin said.

For two months in the fall of 1980, Fisc evaluated value-added networks for user-comfort and reliability by trying out, in hands-on fashion, the available vendor offerings.

"We simply signed up, got our access numbers and began using them," Martin said. "Compuserve was the only network that was comfortable to use right from the start — so reliable that we could always get into it. With the others we often went in and got lost, or the network went down."

Benefits of the network-driven home and small-business services accrue to banking customers, to the banks themselves and to Fisc, according to Martin.

"We haven't done studies to find dollar-justification because, on the one hand, these services are easily justified as a means of reducing in-bank labor and computations, and because their real value is long-term — giving our client banks competitive advantages in the years ahead — which is important to their customers today," Martin pointed out.

"In other words, our client banks

(Continued on SR/34)

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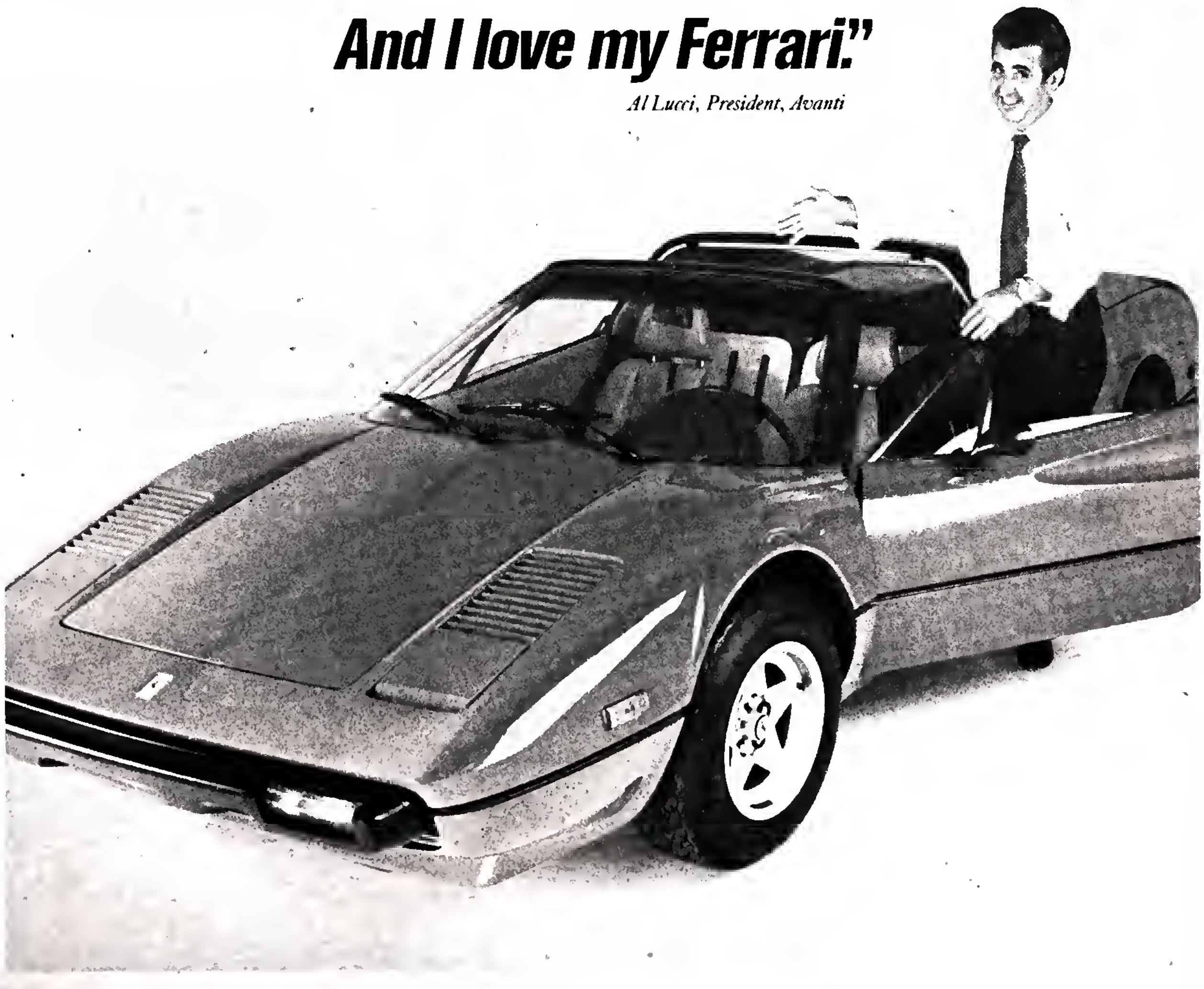

Firm Cashes In on Home Banking With Net

(Continued from SR/33)

have set up home-banking booths in their offices for demonstration purposes. Even though most people don't sign up for home banking right away, they do like to know that it's being offered — frequently that's enough incentive to get someone to open a new account with the bank — and they often end up taking other bank services like telephone bill-paying," Martin explained.

The bank demonstrations are configured with Radio Shack TRS-80 personal computers, and banks typically lease terminals to their largest customers and recommend purchase to other customers. "But most people who are taking the home-banking services are hobbyists and technical or business professionals who already have at-home small computers," Martin said.

For Fisc's Business Manager service, banks recommend IBM Displaywriter terminals for their small-business customers.

"Using our Business Manager service, a small business can track its cash position with up-to-the-minute accuracy and so can make investment-type decisions as effectively as with the largest, most sophisticated banks," Martin said. "Also, because we offer interstate banking facilities among our client banks, small businesses can extend their bank operations with the least possible difficulty.

"Both home and small-business banking services can tie into our DP data base — so customers can get current statements and Certificate of Deposit interest rates — and both give access through the Compuserve network to other information sources, such as the Associated Press' Newswire stock market and financial reports, as well as gateway interfaces to other vendors' value-added networks," he said.

For Fisc, having state-of-the-art network products brings about business advantages similar to those the banks experience. "These concepts are still new enough that most prospects don't feel they need them immediately," Martin said. "But once inside a client bank, the customer-prospect often ends up taking traditional products because they know the bank is investing in their future."

Protocols Seen As Missing Link

(Continued from SR/32)

the external system. This area is known as the communications network.

The architecture (protocol) used in this area is defined by the designer who builds the in-house system or by the company that supplies the data communications facilities used in this part of the system (if the system is not an "in-house" system).

As in both the local and external systems, the foundation of this protocol is provided by the hardware vendor(s). Any additions or enhancements are provided by end-user personnel using vendor-supplied tools and "hooks."

Six Types

There are six types of problems in designing a data communications network:

- Matching the hardware and software components of the local system (henceforth to be referred to as "System A") with one with another so that they work together as a unit.
- Matching the hardware and software components (if any) of the communications network together so that they function as a unit.
- Matching the hardware and software components of the external system (which will henceforth be referred to as "System B") with one another so that they work together as a unit.
- Matching System A to the data communications facility that will be used to communicate with System B.
- Matching System B to the same data communications facility.
- Accomplishing all of the above in a manner that will allow changes to any of the components of the network without necessitating a series of "ripple effect" changes to other components of the network.

The International Standards Organization (ISO) Open Systems Interconnect (OSI) designers hope to define a model for an architecture which, if used by those who write specifications for and manage the construction of applications systems, those who design and manage the construction of data communications hardware and those who design and build data communications networks, will allow the isolation (and therefore the independence and cost saving that accompany isolation) that does not exist today.

Toelle is a master's degree candidate in computer-based information systems at Eastern Michigan University.

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Personal Computer Use Growth Instigating

By Bonnie Hepburn
And Thomas Rarich
Special to CW‡

"Personal computers are spreading like wildfire through corporate offices" according to the July 12 issue of *Business Week*. Both International Data Corp. (IDC) and Dataquest, Inc. estimate that by 1985 4 million personal computers will be installed outside the home in the U.S. alone.

Used wisely, these desktop workstations can be a boon to an organization. They enhance the professional productivity of individual users. Networked together they provide organizationwide benefits with up-to-date, quality information available.

As the use of personal computers in industry grows over the next ten years, so will the need for data communications within this market.

The benefits are already recognized and companies will not be taking a wait-and-see approach to networking personal computers. Dataquest estimates that by 1985, 55% to 60% of all computers installed in the U.S. will be part of a network.

With an intelligent workstation on every desktop, much more of the knowledge worker's time is dedicated to originating and testing creative ideas.

What becomes important in this environment is that workers use standard, reliable data for their studies. Otherwise, everyone has his own data and assumptions, effort is duplicated and data may even be manually reentered needlessly.

Network Essential

A communications network is essential as a vehicle to facilitate professional communication. Networking provides the means for improvements and efficiencies in the use of personal computers.

The ideal network for personal computers, however, is very different from traditional, long-haul data communications networks. Personal computers are inexpensive, so the cost of network connection must also be very low.

Because of their low cost, personal computers will be numerous, so the network must support a very large number of computers.

Must Be Reliable

Not all personal computers will have printers or mass storage, so the network must provide reliable access to these facilities to make effective use of the personal computers. With many personal computers relying upon the network, the network must be reliable.

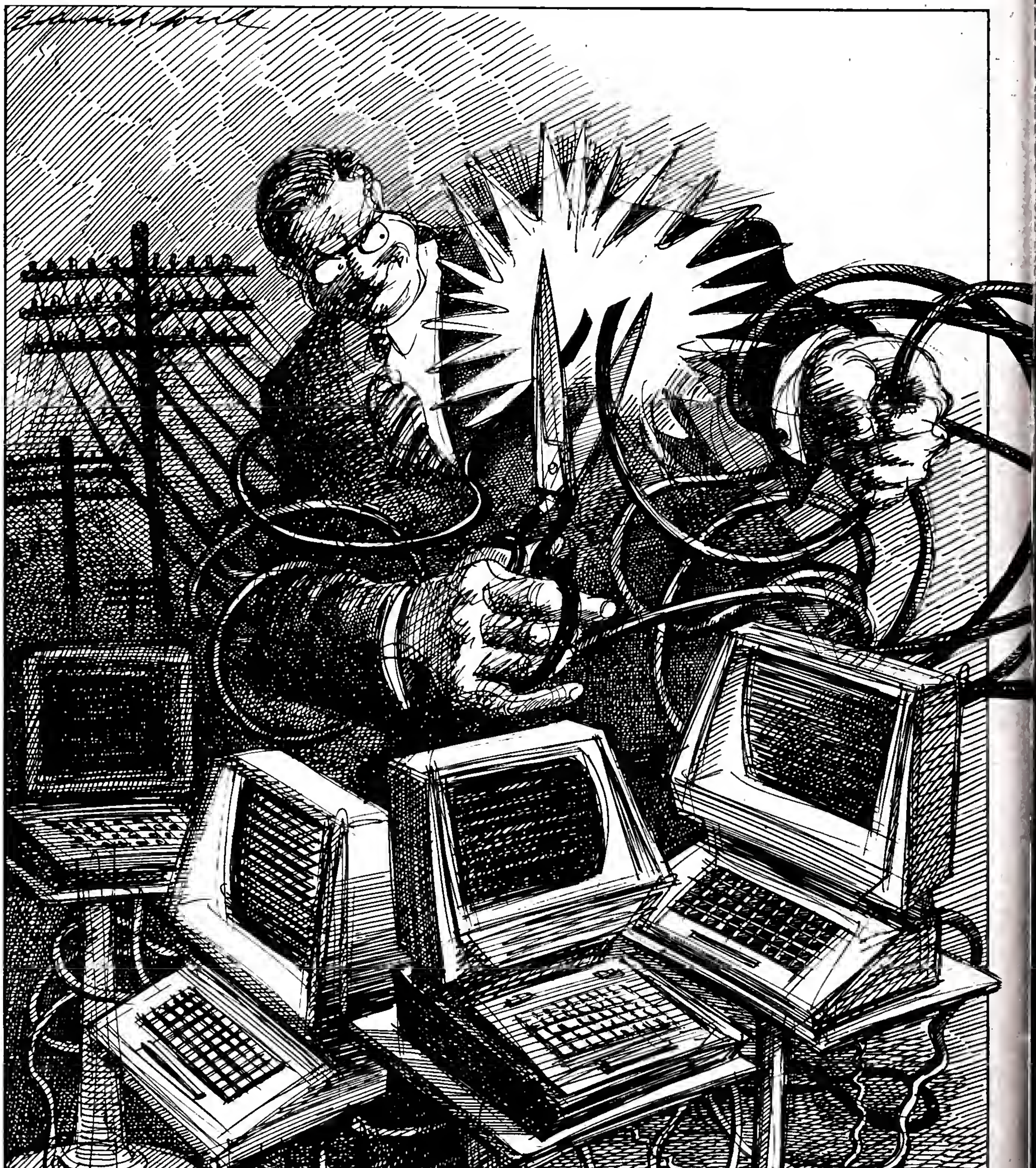
In order to allow effective commnications, every user should be able to communicate with all others efficiently and rapidly. To support good response time for many users, the network must have high throughput.

The organizations that will be buying those four million personal computers in the U.S. by 1985 will be buying them by the tens, hundreds and thousands. The cost of systems is very important, as is the cost of their interconnection.

The cost of node devices (terminals, processors and peripherals) is decreasing, and the number of nodes needed to participate in local-area networking is increasing. Therefore, the cost of connection should be minimized to encourage use of the network. Cost of connection includes cost of transmission media, as well as network and node interfaces.

Reliability is a particularly important consideration when people depend on computers in their day-to-day work.

In the electronic office, data



Rise in Need for Low-Cost, Reliable Network

will be archived on a remote-system disk, rather than stored in a local file cabinet. Personal computer users will require that both their workstation and the network be available to exchange data easily and on demand.

Network interfaces, transmission media and the network in general should be designed so that failure of a component will be unlikely and, if it occurs, will disable only that unit, while not disrupting the rest of the network.

The network's design should provide high reliability and ease of maintenance with little or no interruption of service.

High performance is important to network efficiency, too. Personal computer networks require high-speed computer-to-computer communications.

A user of a personal computer works interactively with the local machine. When data communications is needed with some other site, it will be needed to transmit a memo, retrieve an entire file or report or fetch a new program to run.

High performance is needed to service these large, but infrequent, CPU-to-CPU data transfers with good response time. The user will not tolerate a five-minute wait to fetch a new file from across the network at the 9,600 or 19,200 bit/sec speeds typical of many current networks.

Performance is not speed alone, it is also efficiency. Message routing and network control procedures should introduce as little delay as possible in the transmission of data. Switching, control, access and allocations schemes must provide equitable and speedy access to the network for all users.

Local-area networks that are susceptible to bottlenecks are self-defeating, since local environments are often user-intensive and are the least tolerant when it comes to system delays.

With personal computer networks, as never before, the network is the system.

With Many Micros

Among personal computer users with many micros across their organizations, users will depend on the network to provide many of the facilities that in the past were dependent on an individual computer system. Data and disk storage will be shared (file servers). Expensive peripherals, like printers, will be available to all users (print servers). In addition, computer resources, programs and even access to remote networks will be available to personal computer users through common network facilities (routers, gateways).

New technologies have been developed to support personal computer communications because no existing technology solved those unique problems.

Simple point-to-point connections are impractical for connecting tens, hundreds or even thousands of personal computers. Since only directly connected adjacent nodes can communicate on a point-to-point link, full communications requires either connecting each node to every other node or routing messages through intermediate nodes. Such a network becomes more complex and expensive as the number of nodes grows.

Similar to Multidrops

Personal computer networks are topologically and functionally similar to multidrop networks, in which several nodes share a single line. However, they impose an additional constraint on many nodes.

Conventional, polled multipoint networks are optimized for small numbers of systems. In addition, they are

(Continued on SR/38)

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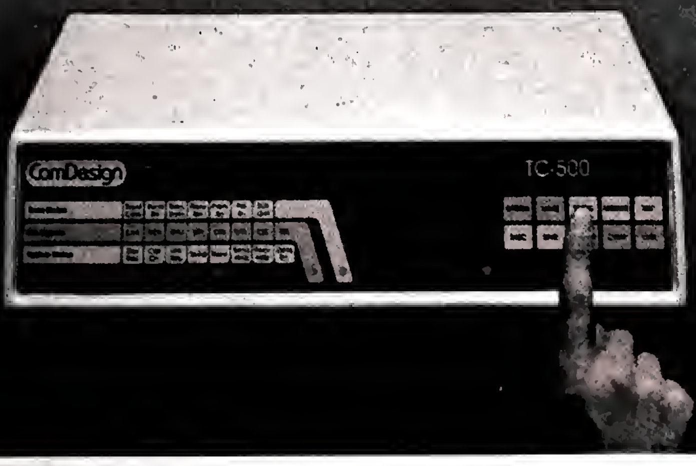


Personal Computer Growth Defining Net Needs

(Continued from SR/37)

too complex to install and adapt to changing system requirements.

Multipoint networks are fine for terminal/host communications but poorly suited to CPU-to-CPU networking requirements for file transfer, program-to-program communication and down-line loading.

For personal computers, local-area networks are the answer. They offer direct communications between all nodes, low-cost connection, high performance and ease of installation, maintenance and management.

Many discussions of local-area networking include consideration of integrated voice, video and data communications.

For personal computers (and others as well), the communications problem is a data communications problem. Certainly, large organizations must also look for solutions to their voice and video communications needs, but data communications is the issue among users of computers.

Xerox Corp.'s Ethernet is an example of a solution to this problem. Ethernet, with a 10M bit/sec transfer rate, is available to participating nodes for the exchange of data. The combination of the carrier-sense multiple access with collision detect (CSMA/CD) mechanism and high-performance coaxial cable makes Ethernet able to accommodate the high-speed burst transmissions of a large number of participating computers.

The problem of connecting personal computers transcends the question of choosing what kind of wire to string among them. It's an architectural issue.

Ethernet and many other similar approaches address the communications problem at the very lowest levels of the International Standards Organization model. They define the physical link and data link protocols only.

Higher Level Protocols

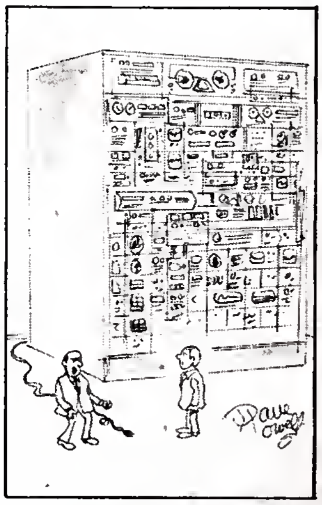
To make full use of the capabilities of a personal computer across a network, one needs to be able to access files and data bases remotely, to transfer files, to make use of remote high-speed printers, to use applications programs on the departmental supermini and to send electronic mail to other users. These functions require the higher level protocols available with a mature network architecture.

Xerox selected Ethernet technology as a suitable local-area network technology for the reasons already described.

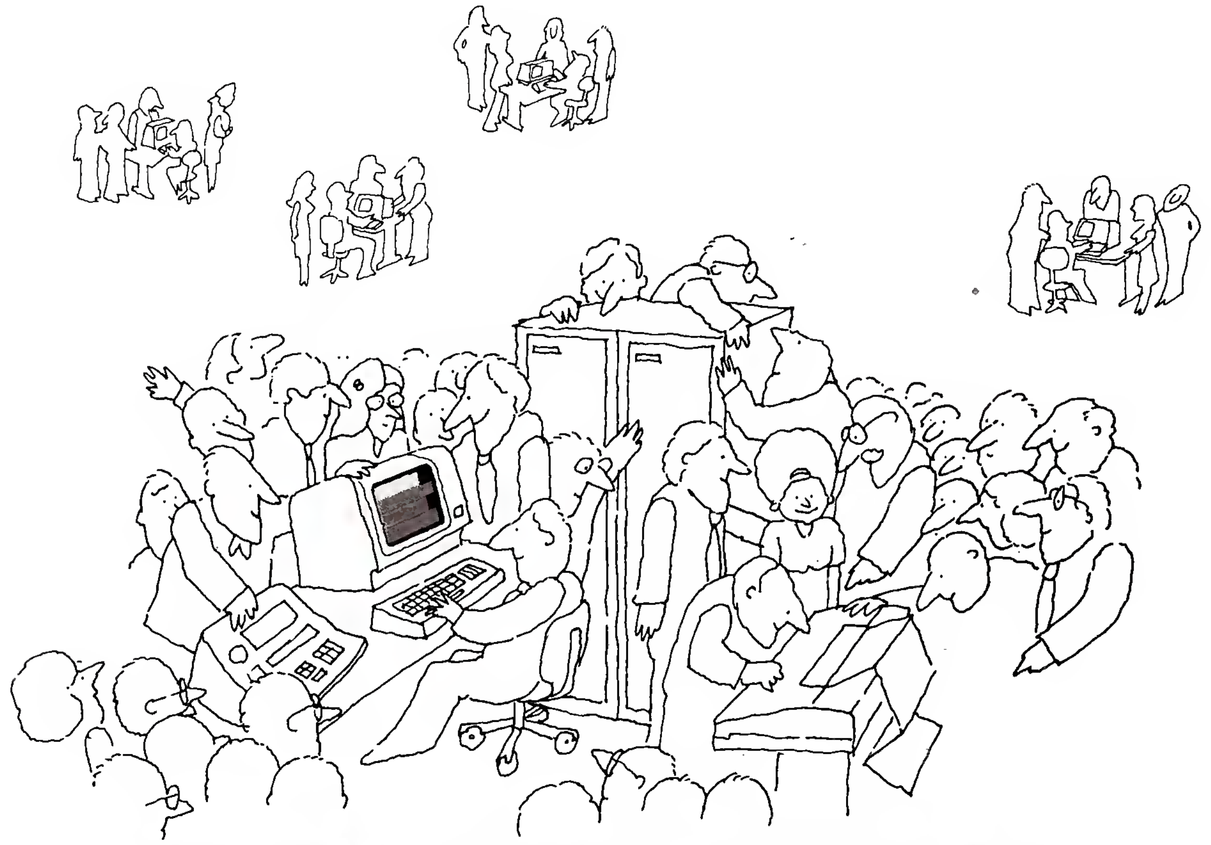
But Ethernet is only one portion of the complete networking architecture that supports communications over leased or dial-up phone lines, public packet-switched networks, microwave, fiber optics, broadband and coaxial cable.

Hepurn is the customer marketing manager in the Distributed Systems Group at Digital Equipment Corp.

Rarich is manager of communications, hardware product management in the Distributed Systems Group at DEC.



'What Do You Mean, There's No Outlet in This Room!'



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We Communicate

Firm Uses Interface Unit to Create Access Net

By Mike Higgins
Special to CW‡

LYNN, Mass. — When a company has more than one computer system, it can be difficult to make sure that all users have access to each of the computer systems.

When the multiple systems are from two different manufacturers, the problem becomes even more complicated. This was the problem the Aircraft Engine Group of General Electric Co. faced two years ago when it decided to acquire several large IBM systems.

Until then Honeywell, Inc. equipment had been used almost exclusively. According to Don Pinnell, manager of data communications for GE's Aircraft Engine Group here, the addition of the IBM systems enabled GE to take advantage of a large body of packaged software.

Ability to Talk

With two computer centers in different parts of the U.S., GE needed the ability to talk to IBM, Honeywell and other smaller systems regardless of the location of the system or the user.

The problem was further complicated by the realization that most packaged software running on the new IBM systems required IBM 3270-type terminals with full-screen editing and high data transmission rates.

The Aircraft Engine Group users were already accustomed to the advantages provided by Honeywell's VIP 7700 protocol with features similar to, but incompatible with, IBM's 3270 protocol.

They also frequently used asynchronous, Ascii CRT terminals to dial up outside systems. Clearly, what was needed was a terminal with a multiple personality so users could talk to each of the different systems in its own language.

Investigation

The data communications group first investigated various intelligent terminals. They found available terminals to be very expensive, with many requiring an additional outlay for a cluster controller.

They then saw an advertisement for an Intelligent Multi-device Interface Unit (IMIU), manufactured by Thomas Engineering Co. of Concord, Calif.

The IMIU combines the functions of a protocol converter, concentrator and terminal emulator into one small box. The IMIU can be programmed to convey any desired personality on a dumb, Ascii terminal.

The group uses IMIUs connected to inexpensive dumb terminals. By typing a resource code, users can request IBM 3270 or Honeywell VIP 7700 personality to be downline-loaded into the dumb terminals from the IMIU.

Figure 1 shows the size and extent of the network. Any computer system can be accessed from a single terminal, located anywhere in the network.

The data communications group looked at a number of other protocol converters and terminal emulators, but found the Thomas Engineering IMIU to be superior to its competition and more reasonably priced, a company spokesman said.

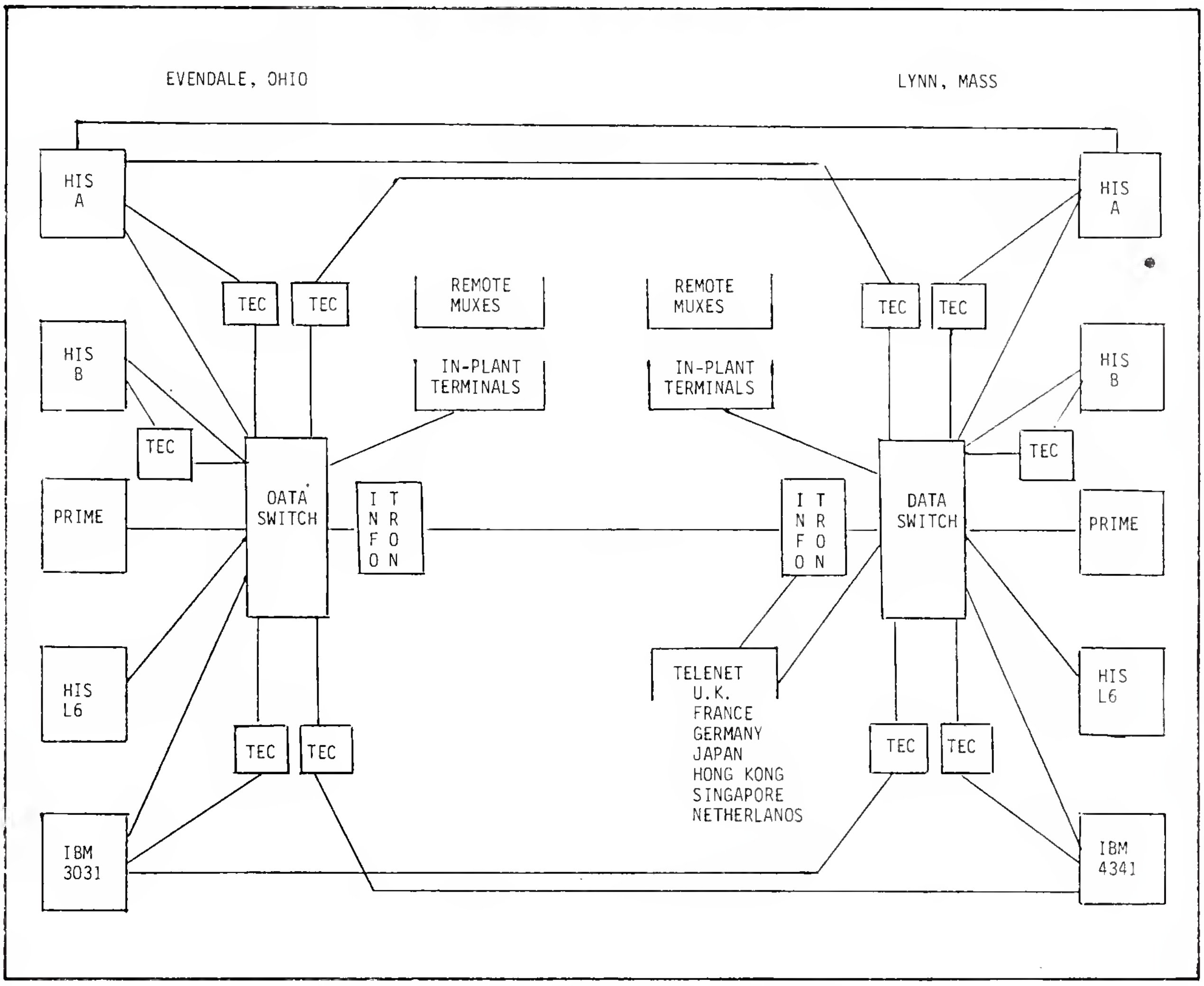

Figure 1: The GE Aircraft Engine Group Network

The IMIU

The IMIU differs from many of its competitors in that it uses a system concept rather than a "black-box" approach. The IMIU can be reconfigured by users as their requirements change, whereas other devices are preset at the factory and must be returned for reconfiguring.

The IMIU actually controls the terminal, rather than just passing data back and forth. This is the basis for the device's ability to allow inexpensive, dumb terminals to be used in place of expensive, smart terminals (Figure 2).

The bus system is fully Intel Corp. Multibus-compatible, and the operating system is Digital Research, Inc.'s CP/M. The components are housed in a standard, 19-in., rack-mountable chassis.

How can the IMIU offer so much performance at a relatively low cost? According to Tom Fawcett, president of Thomas Engineering, the most significant reason is that the IMIU's highly efficient software requires less hardware than other systems to perform the same tasks.

Fawcett pointed out that IMIU requires only a single 6 MHz Zilog, Inc. Z80 chip to handle as many as 28 lines. The need for only a single CPU chip results in lower testing and maintenance costs, as well as lower parts costs, Fawcett added.

An IMIU, priced under $10,000, combined with 16 dumb terminals costing between $500 and $1,000 each can replace 16 IBM 3278 terminals and a cluster controller costing about two to three times as much. In addition, the same terminals can emulate Honeywell VIP 7700 protocol and can also be used to access other systems with Ascii asynchronous protocol.

Support

The IMIU can support any Ascii device, a feature that aids another group at GE. This group connected bar-code printing terminals and bar-code readers to the IMIU. The IMIU acts as a concentrator, mapping data onto the data stream and sending it back to the host computer.

The data communications group plans to add synchronous terminals to the network, such as remote printers. The Evendale, Ohio-based computer center, which has an IBM 3081,

(Continued on SR/42)

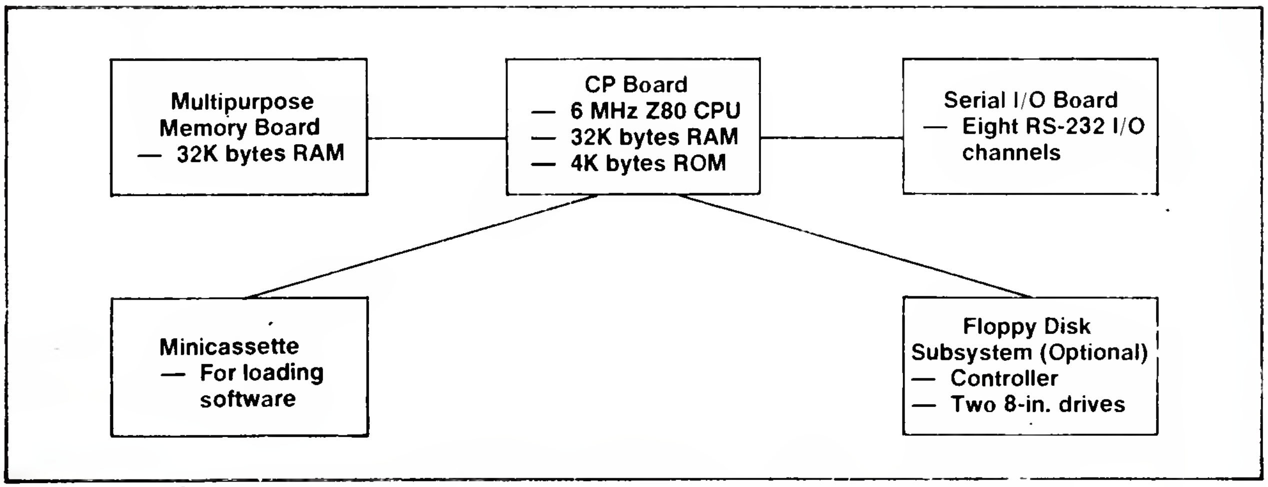

Figure 2: The Thomas Engineering Intelligent Multidevice Interface Unit

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The next issue of *Computerworld OA* will focus on selling office automation within an organization. This special report will feature the human angle of office automation and highlight the strategies of selling the concept of OA to top management and end-users in an organization. You'll see articles on implementation techniques, feasability studies, human interface, ergonomics and productivity.

And, of course, you'll see several articles on current happenings in all aspects of OA.

There will be bonus distribution of this issue to attendees of the Info '82 Show in New York this October.

The issue date is September 29th.

For more details on *Computerworld OA* and the people who read it, just contact your local *Computerworld* representative, or call Bob Ziegel, Vice President at (617) 879-0700 for all the information.

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No Need for All-Or-Nothing View

Local Nets Can Enhance Mainframe-Based MIS

By Glenn Miyashiro
Special to CW‡

A major reason many corporate management information systems (MIS) directors and managers dismiss any consideration of local-area networking technology is that they mistakenly view the situation in an all-or-nothing context.

They must either shift completely to a local-area network solution or stay with the traditional hierarchical structure, with the corporate mainframe computer linked to terminals throughout the company via phone links, dedicated or otherwise.

Such is far from the case. Indeed, if properly integrated, local-area networking can enhance the performance of the traditional mainframe-based MIS in at least three ways.

Bottlenecks

In hierarchical structures typical of most MIS organizations, the sales and marketing area is often subject to communications bottlenecks. Consider the following situation. Authorized managers call up data on customer orders, track bookings or enter customer information with terminals linked to the mainframe, not performing interactive transactions on a continual basis, but rather sporadically accessing the company's master files. Here, management is forced to install additional terminals, seldom more than a few hundred to a few thousand feet away from the first.

Consider the simplest case where there is just one terminal, but peak traffic volume has increased to the point that a second terminal is required. In many cases, the existing front end must be expanded to accommodate an additional port.

Now two lines come into an area having very low utilization over a long time period. And for each new terminal, another line must be added.

Solution

The local-area network solution to this problem is shown in Figure 1. The first communications line is brought into the area and connected to the information display terminal. This line to the computer center is now a "server" in local-area network terminology — a resource that exists to serve all users in the network. The terminal can now be a node on a low-cost network system.

The terminal is also the "gateway" node, in that all information it sees can also be seen on all other terminals in the local-area network.

Additional terminals — defined in local-area network technology as "users" or entities that contend for the resources provided by the server — are added as nodes on this network. They have the ability to access data on the master file in the main computer as if each was the only terminal connected.

Cost-Effective Expansion

When traffic increases to the point that two users must simultaneously access files, then and only then is it necessary to add the second line coming into the location, and then only to the single gateway node.

The rest of the community of interest (COI) is unchanged, thereby allowing any two users to access data files simultaneously, without any wiring alterations or switches.

MIS managers at rapidly

(Continued on SR/42)

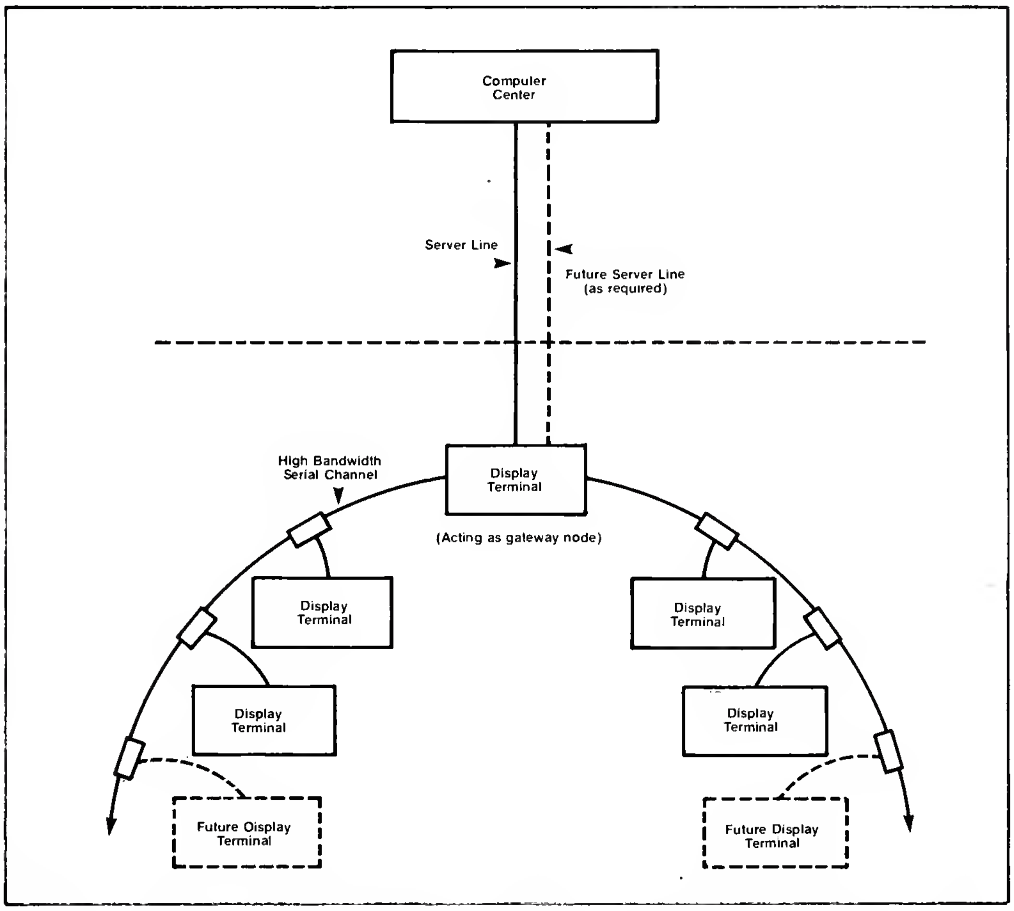

Figure 1: Community of Interest (Sharing a Communications Line to the Computer Center)

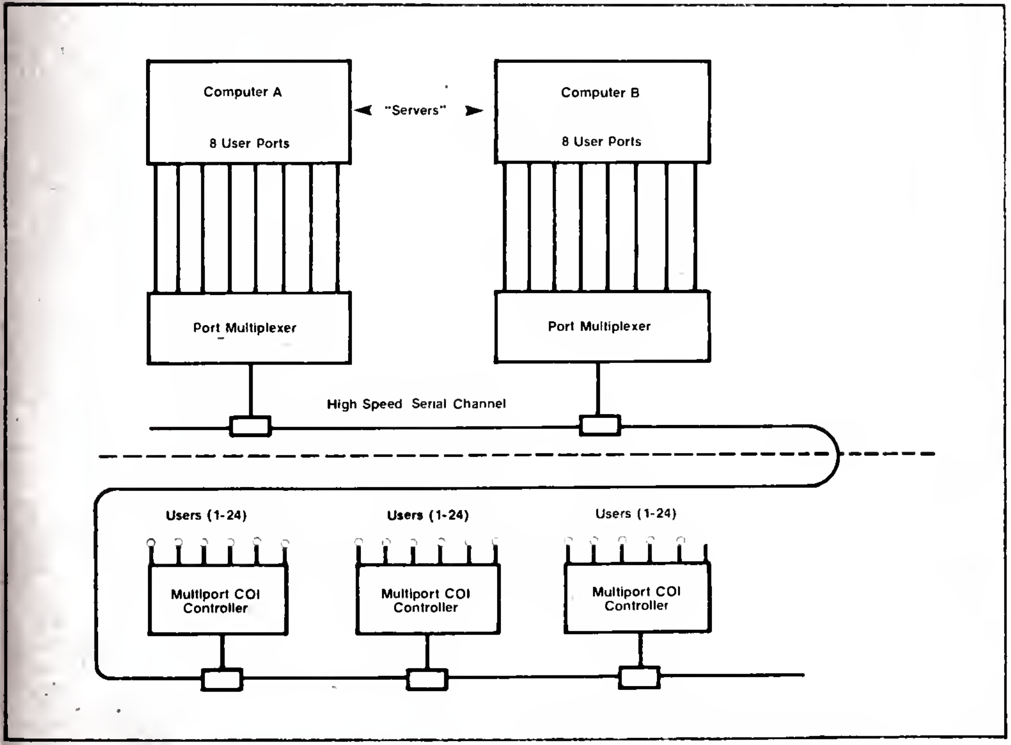

Figure 2: Adding a Second Computer as an Additional Resource In a Local-Area Network

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Local Nets Enhance MIS Performance

(Continued from SR/41)

growing small to medium-size companies, must try to expand data processing services in the most cost-effective manner. A common experience is to find that a small — for example, eight-user — system purchased from computer manufacturer A has rapidly been outdated in terms of increased DP requirements.

The most straightforward solution is to go back to manufacturer A and purchase a newer, more powerful system — a 16-user system — at, of course, a higher price. Unfortunately, computer manufacturer B has made a recent product announcement offering a system for 16 users at a price equal to that of the original eight-user system from manufacturer A.

The company's MIS director is then faced with an uncomfortable dilemma. On the one hand, if he purchases the best machine for his money — computer B — he immediately obsoletes all the company's data files and applications programs on computer A.

Facing the Problem

If he chooses to opt for data compatibility, he must face the heat for purchasing a more expensive system. Whatever his decision, he spends even more money and effort to conduct an extensive evaluation of the company's needs to find out which alternative is the most cost-effective.

This kind of problem is virtually eliminated by choosing the local-area network route. As shown in Figure 2, this is done by adding what is called a port multiplexer to the user ports of computer A and B, thus changing their functions into network servers.

As illustrated, these port multiplexers are then connected via inexpensive coaxial cable to COI controllers. Each COI controller could be the hub of a COI, be it engineering, accounting or any other community.

Despite the basic incompatibility of the two computers, a user can now log on to either system by simply typing in an authorization code. A user could even be locked out of a particular computer depending on his access privilege.

An additional benefit exists: Now there can be more terminals on the installation than computer ports.

Remote Communications

In most large corporations, various company functions are seldom found in a single geographical location. Typically, manufacturing functions are the most widely dispersed, either down the street or several thousand miles away.

The remote manufacturing facilities' terminals are usually linked to the central computer by telephone modem links and multiline rotary, which is an expensive solution.

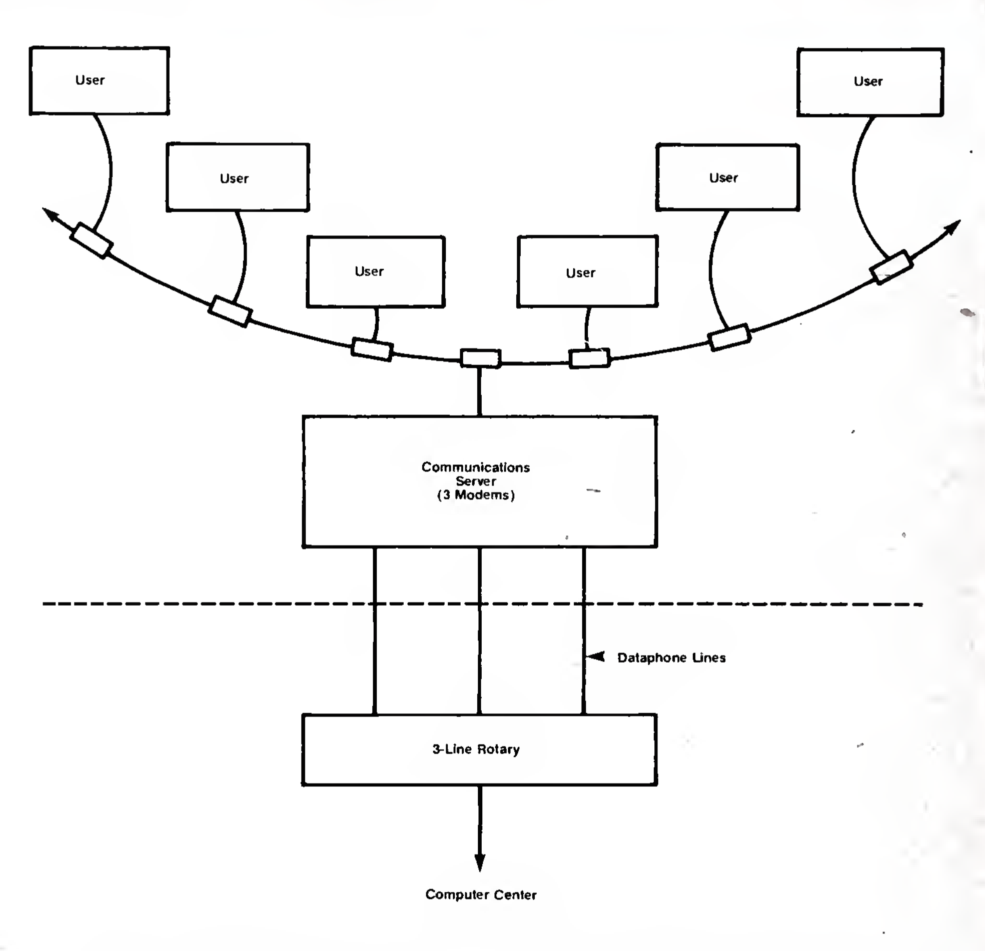

Figure 3: Using Modems and Dataphone Lines as Communications Servers

For example, if the remote facility has 12 terminals, 12 modems must be installed — one for each terminal — in addition to 12 dataphone lines and a multiline rotary at the computer center, no matter how high or low the usage on any particular terminal.

Line and Modem Reduction

Installation of a local-area network in this particular situation makes it possible to reduce the number of data lines and modems by as much as 75%.

First, it is necessary to determine the number of simultaneous interactive sessions the local COI will require — in this case the remote manufacturing location.

If the number of simultaneous interactive sessions happens to be three, all that is necessary, as shown in Figure 3, is to install three modems and three dataphone lines at the remote site and connect the modems to a three-port modem controller.

The modems now act as a network resource — or a communications server. The 12 terminals can then be connected to the COI controller via a single high bandwidth serial channel.

Now, any three users can dial up the remote site. Additional users can also be attached without adding more COI controllers as long as only three simultaneous interactive sessions are taking place.

Miyashiro is marketing director at the Destek Group, based in Mountain View, Calif.

Firm Saves With Link

(Continued from SR/39)

will soon be adding several hundred IBM 3278 terminals to sites located in Cinncinnati, Lynn and satellite service areas for materials operations.

This new subnetwork will use the IBM Synchronous Data Link Control/Systems Network Architecture protocol. The group also has plans to bring up a multisystem network facility.

In presentations on the subject of this vast network, Pinnell often notes that the size and complexity of the networks we can design today are limited not by our imaginations, nor by the capabilities of the equipment, but rather by the size of the viewgraph projectors available for displaying diagrams of the networks.

Higgins is a free-lance writer who specializes in articles for computer industry trade magazines.

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Special to CW

CHICAGO — "Having information is not the important thing — the important thing is to use it," said Gary Raymond, executive vice-president of Triple-A Specialty Co. here.

At Triple-A they have been both gathering and using information in a way that has completely revolutionized the way the firm does business.

Thanks to something called manufacturing resource planning (MRP) and a carefully coordinated computerization effort that began in 1974, the firm now has control over every phase of its operation. And that control has meant monetary savings.

Triple-A, with $15 million in annual sales and about 150 employees, makes automotive parts, test and service equipment such as battery chargers, testers and jumper cables. It produces the products under the brand names of about 200 OEM accounts, plus their own brand names of Silver Beauty, Microstart and MSW.

Detailed Study

In 1974, Raymond recalled, the firm began a detailed survey of all its DP needs. The accounting department had outgrown the mechanical business machines it had been using, and the replacements were so expensive it was decided to reexamine the accounting needs of the entire company.

"We weren't particularly looking for a computer to begin with," Raymond said, "but after a year and a half, we had written specifications for an integrated data base system.

"We saw that computers fell into two groups — large, fancy and expensive batch systems and minicomputers. We decided to go with a minicomputer to avoid large maintenance costs, and so we wouldn't be locked into one machine for years while technology advanced," he said.

"We chose a Datapoint Corp. machine because it had the best disk operating system with the easiest, most user-friendly software," he recalled.

Going to Network

Triple-A initially purchased a Datapoint Datashare system with a processor and four terminals running concurrent programs under Databus, Datapoint's high-level business-oriented language. They began using it for order entry and to track engineering specifications for each of the 10,000 different parts used by their manufacturing process. After a year, they added two more video workstations and began using the system for marketing analysis, bills of materials and purchasing.

With all these applications running on the computer, response time began to rise until it became clear that more processing power was needed. As it happened, the solution to the throughput problem was at hand in the form of the Attached Resource Computer (ARC) local network system, introduced by Datapoint in late 1977.

An ARC network allows up to 255 Datapoint processors to share the same disk files and other peripherals. Processors can be added or deleted without affecting the operation of the network as a whole.

By going to an ARC network with seven processors, Triple-A found it could increase throughput by a factor of 4.5 — providing all the

(Continued on SR/46)

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DISTRIBUTED PROCESSING NETWORKS

Another in a series of messages on advanced technologies from Honeywell Information Systems.

Many data processing professionals are being faced with demands for networks capable of moving increasing amounts of data among more and more locations. Up to now, application-dependent network structures – with their inherent risk of major conversions – offered the most readily available response. Honeywell's Distributed Systems Architecture (DSA), however, provides a more practical alternative. An application-independent networking structure, it fully supports public, value-added, private and international nets.

World-Class Networking Today

Honeywell's DSA establishes standards for data movement and application cooperation in compliance with the International Standards Organization's (ISO) open systems reference model. The architecture, which is not dependent on specific technology or techniques, keeps applications and communication processes separate. Thus DSA is transparent to the end user. DSA creates a cooperative, flexible environment within which the user can build and phase in a communications system that can handle current applications and grow to meet new domestic and international demands.

DSA Structure

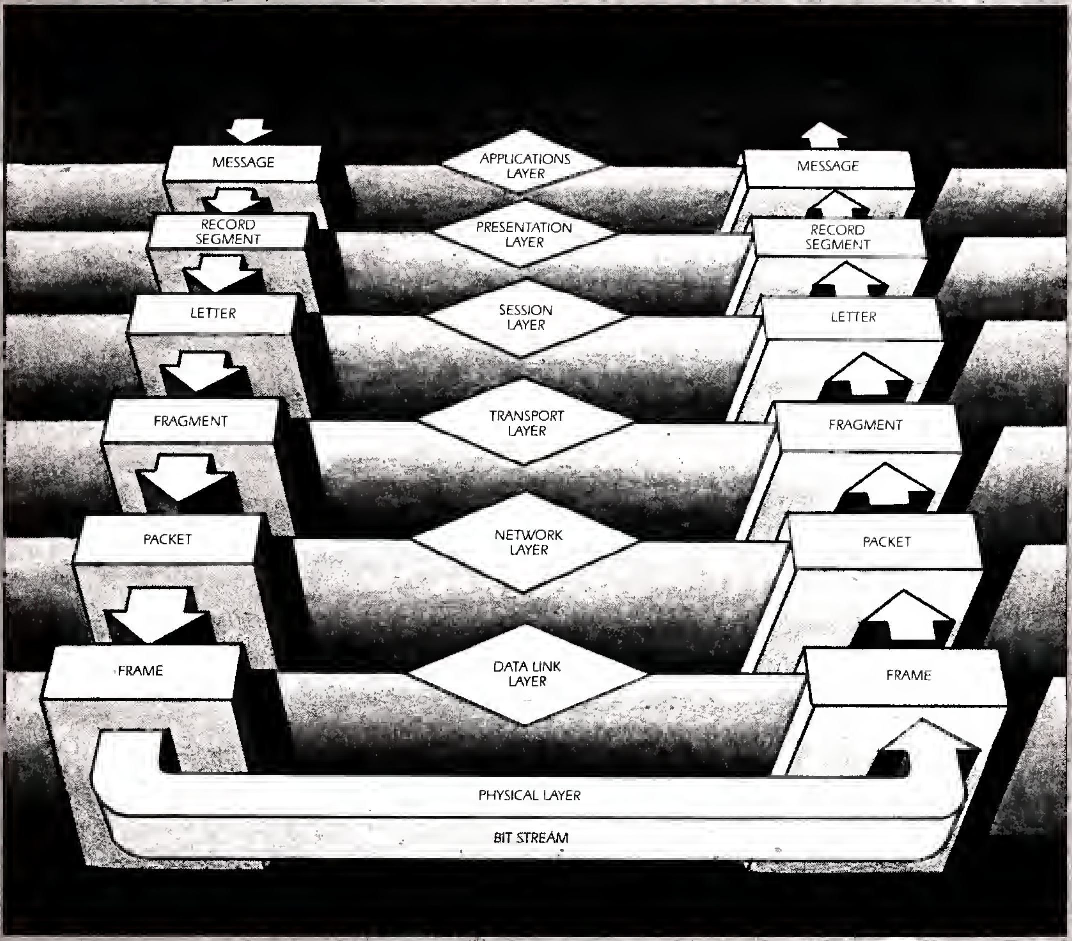
DSA's flexible set of rules, protocols, and interfaces allows users to configure and implement data processing systems and networks to help meet the needs of geographically dispersed organizations. Introduced in 1980, DSA consists of a seven layer architecture divided into three groups. The implementation of the first four layers in the Communications Management group controls physical exchanges across the network. The next two layers, the Message Management group, format messages so that the communicating entities can understand each other. They also contain the dialog mechanism that permits communicating activities to synchronize their actions, and the presentation control services which provide application independence from data format, character codes, and terminal handling conventions. The seventh layer, Applications, defines the logical rules to which computer applications conform when communicating. Finally, each layer of DSA also provides network administration and control data to enable overall network control of the distributed system.

Network Support

Because DSA conforms to the ISO open systems model, it's certified as providing native support for the CCITT international X.25 packet-switched and X.21 circuit-switched network protocols. These protocols are being implemented in a growing list of public data networks around the world as well as in value-added and private networks. DSA products support such X.25 based networks as TELENET and TYMNET (United States), DATAPAC (Canada), DATEX-P (Germany, Austria), DDX-P (Japan), DN 1 (The Netherlands), EURONET (European Economic Community), PSS (United Kingdom), EDWP (Switzerland), and TRANSPAC (France). Also supported is the X.21-based NORDIC Net (Scandinavia, Finland). DSA uses High-level Data Link Control (HDLC), also an ISO standard, for data communications between intelligent devices in private networks. Users can configure hierarchical, peer-coupled and hybrid network topologies.

Product Implementation

DSA already enables medium-scale and large-scale host computers and mini-computers to operate in a variety of network configurations. Specialized network processors can be utilized for front-end processing, remote concentration and switching, in addition to communications control and administrative functions. The implementation includes such distributed processing applications as file transfer, remote job entry, terminal concentration and two-level transaction processing as well as office automation applications, including document distribution and host storage, and printing of documents. In addition, DSA administration permits monitoring, control, and maintenance of the network from one or more control sites.



DSA consists of seven layers of functions and protocols governing data handling among network nodes. DSA's implementation of the bottom four layers makes physical exchanges across the network transparent to the end user.

Future Growth

DSA is an important part of Honeywell's implementation of its Distributed Systems Environment (DSE). Future DSA developments will support fully-distributed transaction processing with system-supplied coordination, control, and recovery, load leveling, and resource sharing across computers. This type of peer network will allow host and satellite processors to cooperate as full equals in distributed systems. The open architecture will be further enhanced to meet evolving international network standards while protecting investments in systems already installed. Additionally, data bases will be partitioned across multiple processors with automatic access and updates at all locations. Thus DSA is part of an evolution to fully distributed systems with globally accessible resources.

More on Distributed Processing Networks

For an in-depth description of the DSA open architecture call our toll free number, 800-343-6294 (in Massachusetts call 617-552-2264) or write Honeywell, 200 Smith Street (MS 487), Waltham, Massachusetts 02154.

SECONDARY NETWORK

SECONDARY NETWORK

SECONDARY NETWORK

PRIMARY NETWORK

Honeywell

Auto Parts Firm Controls Operations With Net

(Continued from SR/43)

throughput that they needed, Raymond recalled. Since that time, as more and more applications have been developed for the system, Triple-A has been able to meet increased processing demands simply by adding more processors to the network.

Today, the Triple-A network has three file processors handling 250M bytes of disk storage, four Datashare systems supporting 13 video workstations and eight application processors used for word processing, batch processing, printer unspooling and program development.

The list of applications goes on and on — order entry, accounting, bills of materials, inventory control, purchasing, manufacturing scheduling, labor tracking, cost estimation and sales analysis.

"With the system, training is very fast. In our sales department, it used to take three months for people to become productive. Now they're productive the same week they're hired, and they can do 80% of the job by the second week. Turnover doesn't hurt as much," he said.

Saving Money

Triple-A began using MRP on a companywide basis shortly after upgrading to an ARC network. "During 1979, we experienced an increase in inventories and not until June 1980 did it come down to the original levels," Raymond recalled. "Then, in 1981, we were able to reduce the inventory to $1.5 million below the level it was in June 1980," Raymond said, adding, "we not only freed up capital, but we saved about $200,000 a year in interest expenses on that capital.

"So MRP took about 2½ years to make itself felt. No company should get into MRP expecting immediate results," Raymond cautioned.

"The system has allowed us to plan and control production instead of just reacting to orders as they come in," according to Raymond. "Previously, purchasing was based on historical usage. Now, purchasing is planned on the basis of projected finished product needs.

"Now we know the exact labor and materials costs on all our work. We don't have fudge factors anymore, and our OEM business has gone up 30% since 1980," Raymond explained.

The Future

"From the requests coming in from the other departments, we can see that we are really only at about 10% of where we want to be," Raymond said.

"Quality control and customer service are next. We are setting up an 'artificial intelligence' program to analyze a product's repair history and simulate the most probable cause of product failure.

"Detailed information on the background of each individual item we make is already available to the system, since product serial numbers are printed on special material by a system printer. All we have to do is get an item's serial number, and we know when, how and by whom it was made," he said.

Exceeded Expectations

"All in all, the users are so thrilled by the system that use has far exceeded our original expectations," Raymond explained.

"But without the ARC network concept we would have had to upgrade twice by now, each time getting a bigger machine instead of just adding more minicomputers.

"We would have paid a lot more money, and we still would not have gotten what we wanted," according to Raymond.

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Kemper Life Testing Pilot Of Automation Program For Insurance Agencies

LONG GROVE, Ill. — A new pilot program designed to help insurance agencies automate their offices is now being conducted by Federal Kemper Life Insurance Co.

Called the Agency Information Manager (AIM) 2 project, the program serves 11 general agencies that use CRT terminals and telecopiers to communicate with the company's home office here.

Currently operating with a face amount of life insurance in force of $19 billion, assets of $375 million and a home office staff of 300 employees, the company sells its life insurance products only in the U.S. through 500 independent general agencies, including personal-producing general agents, brokerage general agents, stockbrokers and agents of Kemper property and casualty companies.

Growth Through Automation

Growth has been spurred by Kemper Life's continuing efforts to provide the best possible service to its insurance agents. The company completely automated its home office operations in 1974 to speed up service.

In addition, the company developed a team approach in which individual teams consisting of an underwriter and two underwriter service representatives completely handle processing operations that in a conventional "assembly-line" system would require many different departments and hundreds of people.

Facilitating more efficient, productive processing, this approach, which now involves the use of 30 teams, enabled the company to provide better, more personalized service to agents and faster response to their information needs.

OA Needs

Kemper Life next turned its attention to the office automation needs of its agents, according to Philip F. Mooers, new business operations officer for the company and another Kemper Group life insurance company called Fidelity Life Association.

"Office automation at Kemper Life was highly successful," Mooers said. "Our average issue time improved even as sales grew, enabling us to reduce our ratio of staff to work load. The bottom line was that we increased our net profits from $11 million in 1978 to $20 million in 1980.

"Agents need increased profits to survive in today's life insurance market," Mooers concluded. "At the same time, a profit-making field force is vital to the survival of Kemper Life."

Responding to this need, Kemper Life launched its AIM 2 project in the fall of 1981. A pilot program in network communications as well as in agency office automation, 11 Kemper Life agencies are participating in AIM 2 — all but one of which are among the top 20 producers for the company.

To implement the program, Kemper picked up the full cost of installing CRT terminals and telecopiers when needed in agency offices.

Six agencies now use Hazeltine Corp. CRT terminals to communicate with Cybertek Computer Products, Inc. terminals in the company's home office through a dial-up phone line configuration. The other five

(Continued on SR/48)

Agencies in the AIM 2 project use terminals and teleprinters that provide electronic mail, information access and status inquiry capabilities.

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Kemper Life Trying Out Office Automation Program

(Continued from SR/47)

agencies, two of which also have dial-up capabilities, use Courier Terminal Systems, Inc. CRT terminals to communicate via digital leased lines.

Telecopiers Installed

The company also installed 3M Corp. 9600 digital facsimile transceivers and, in some cases, 3M 9136 digital/analog facsimile transceivers in agency offices, depending on volume. These telecopiers are used to transmit copies of documents at speeds of up to less than a minute per page to two 9600 and one 9136 facsimile units operated in the company's home office.

According to Jo Anne Eisbrener, manager of the AIM 2 project, the program is divided into two phases. All 11 agencies are participating in the first phase, which consists of providing agencies with electronic mail, information access and status-inquiry capabilities. Two of the 11 agencies are taking part in the project's second phase, which, in effect, converts them into minihome offices capable of performing a broader range of functions including submitting applications via terminals and telecopiers.

"The objective of the project is to determine what agencies need in terms of electronic communications to save time, reduce phone expenses and mail delays and speed up service to customers," Eisbrener said.

"We realize that all communications can't be handled electronically. But we anticipate that the most cost-effective balance between electronics and personal communications will evolve out of the project," she said.

Two Configurations

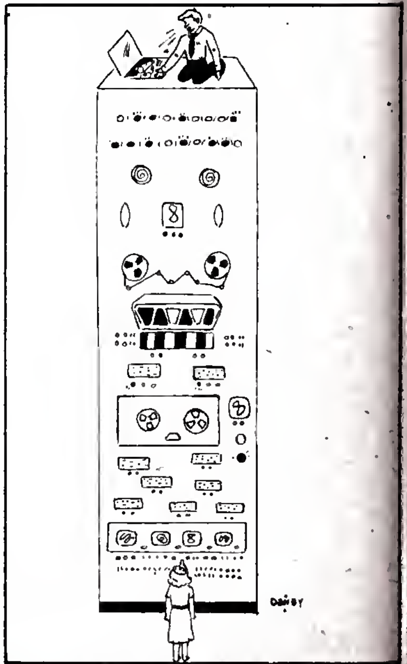
Kemper Life uses two types of dial-up configurations in its network communications with agencies.

In one configuration, three agencies with minicomputers use 2760 and 3270 protocols to dial up to a controller connected to the company's IBM mainframe computer, according to Eisbrener.

In the other configuration, three agencies use a 3270 protocol to dial up to the mainframe through a minicomputer.

The five agencies operating with digital leased lines use a 3270 protocol to communicate with the mainframe through a front-end processor.

"We're also experimenting with dial-up and digital leased lines in different configurations to determine the most cost-effective method of achieving network communications," Eisbrener said.



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CWS 9/27

Firm Ties Dissimilar CPUs, Saves With Interactive Net

This collector at Gecc's regional service center in Warwick, R.I., can see the payment history of the delinquent customer she is about to call.

STAMFORD, Conn. — As anyone who has tried it can affirm, designing and installing a national, multiuser and multifunction interactive DP network is no easy task. And it does not get any easier if you are using several dissimilar mainframes — all of which are to be accessed by the same communications lines and terminals.

But that is what General Electric Credit Corp. (Gecc) has done, according to a company spokesman.

Gecc's business activities include leasing, financing, credit and financial services, but when it began developing its on-line network in 1974, Gecc was primarily interested in improving the efficiency of the collection and credit authorization functions of its retail and real estate financing operations.

Gecc provides financial, collection and credit authorization services to more than 5,000 companies, ranging from one-store "mom-and-pop" operations to giant discount chains. Its files contain credit and payment data on more than three million people.

Similarly, the company keeps track of loan payments of more than 150,000 mobile home owners for some 1,200 dealers throughout the country.

All of these files are currently stored in Honeywell, Inc. and Tandem Computer, Inc. systems at the corporation's headquarters in Stamford. They are automatically updated overnight with customer payment data transmitted in a remote job entry mode from the company's payment processing centers in Atlanta and Canton, Ohio.

Accessed On-Line

These overnight-updated customer files are accessed on-line throughout each business day by credit authorizers, collectors and customer service representatives. There are 150 Gecc field offices throughout the country utilizing more than 1,400 Bunker Ramo Corp. Information Systems CRT terminals.

Other elements of the network include 150 Bunker Ramo minicomputer-based programmable control units (PCUs), which act as communications controllers and line concentrators, and about 150 General Electric Co. Terminets, used to make occasional hard copies of screen contents.

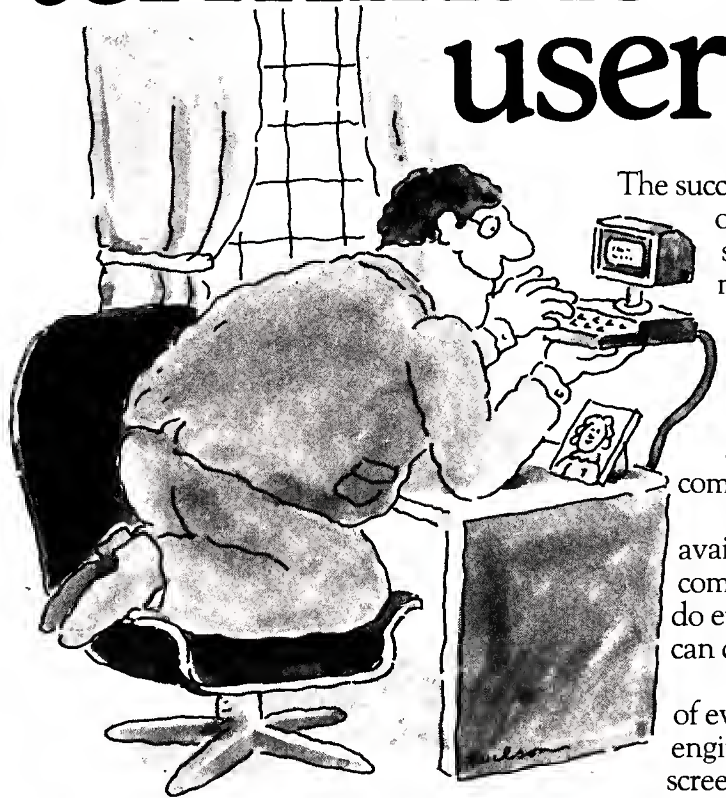
Establishment of the on-line system has had many beneficial effects on Gecc and its customers. Prior to its development, collection and credit authorization departments at Gecc's field offices worked with manually updated files supported by a batch processing system. Because customer payment and credit use records under this system were often five or more days behind, disputes with customers over late payments or credit authorization denials were all too frequent.

Today, current customer account records are automatically displayed on the CRTs at each collector's desk as soon as an account number is keyed in. These displays include such basic data as the customer's name, last known address, phone number, amount owed, credit line and last payment date — current as of the previous day's mail receipts. In addition, the screen provides data on the customer's employer, family and friends, if available, plus a history of past efforts to contact the customer and the results of those efforts.

As new information, such as a change of address or phone number, is obtained, the collectors key this information into the system and it im-

(Continued on SR/50)

Very small terminals for IBM users.



The success of any computer network depends on its acceptance. That's where many systems fall short. The terminals on the market today simply don't fill the needs of today's offices. They're big, boxy and awkward to operate.

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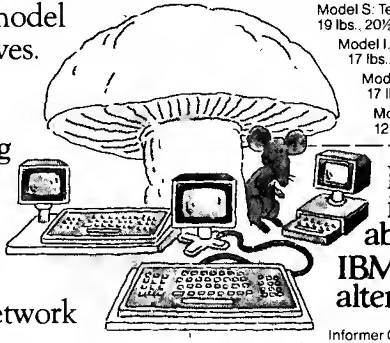

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Model I. Executive Inquiry Terminal 9" CRT
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Credit Firm Ties Different CPUs in One Net

(Continued from SR/49)

mediately becomes part of the customer's permanent file.

Credit authorizers at the 150 Gecc field offices nationwide also have direct access to current customer files. As credit card holders attempt to make purchases at retail outlets, cashiers at these stores are required to call the nearest Gecc service center for credit approval.

As authorizers receive the account number and amount of purchase from the store representatives, they key the information into the system. The system then either displays a credit authorization number, which is relayed to the clerk over the phone, or indicates that credit has been denied. In the latter case, the authorizers can call up the customer's account history for display.

In most cases, the reason for credit rejection, such as gross excess of credit limit, closed account or stolen card, fully justifies denial of credit. When the purchase will bring a good customer's balance only slightly over the credit limit, the authorizer has the ability to override the system with supervisor approval.

The average credit authorization takes approximately two seconds. Prior to installation of the on-line system, the average time required for such authorization was two minutes, Gecc reports.

As a result of this significant increase in productivity, Gecc has reduced the number of credit authorizers needed by its field offices by as much as 50%. There has also been a 50% reduction in the number of Wats lines required by each field office for credit authorization, the company reports.

Gecc was also able to use a highly efficient communications protocol development by Bunker Ramo for its Series 2200 on-line branch banking system. By making minor modifications to this protocol, Gecc was able to use 4,800 bit/sec synchronous communications lines between its remote centers and its host Honeywell 6000 mainframe.

Unique Net

According to Thomas L. Pullen, Gecc's manager of telecommunications planning, the company's network, developed in the mid-'70s, was unique for its time.

"In that period the industry had pretty much standardized on the IBM 3270 protocol, which was geared to the use of 2,400 bit/sec bisynchronous communications lines. Our network provided us with much better response times with many more devices simultaneously on line," he said.

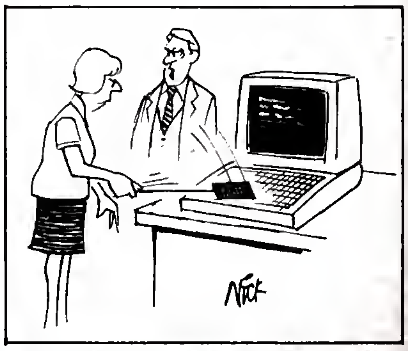
While the collection support system was being installed in the mid-'70s, a separate on-line system for credit authorization, utilizing TRW Corp. CRTs and a TRW mainframe, was also being established at Gecc's field offices.

Offices Equipped

Between 1974 and 1976, 20 of the company's local field offices were equipped with both of these separate, but parallel systems. Both systems worked fine, Pullen said, but it was soon realized that distribution of dual systems to each local office would not be cost-efficient. At the same time, Gecc management decided to reduce its field offices throughout the country from 350 to 150 by consolidating a number of functions in larger, multipurpose facilities, he added.

"In order to manage the message switching between our large Honeywell and Tandem mainframes in Stamford, we took a standard Honeywell Level 6 system and developed software for it that turned it into a front-end network processor that directs messages coming from the Bunker Ramo PCUs at the regional field offices to the appropriate processing system according to application," Pullen explained.

However, Pullen and his associates at Gecc continue to look for ways to improve the capabilities of their communications-oriented data processing system. "Under consideration, along with other options, is the possibility of using the data storage, programmability and computational power of the PCUs to provide distributed processing capabilities, such as credit application processing, to our field offices," Pullen said.



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And It Only Took a Year

Insurer Allots Terminals to 80% of Its Agents

HOUSTON — The Great Southern Life Insurance Co. began providing portable point-of-sale terminals to its general agents as a sales tool early last year. By the end of the year, 80% of the general agents were using terminals.

Simultaneously, the company introduced a Universal Life Insurance policy, "the base reason to use the terminals."

These developments occurred at the same time that Great Southern increased its general agents by 30% and expanded its marketing base of Universal Life throughout its operating territory.

"Results in 1981 were fantastic in terms of premium income increase and growth of our agency force," according to Raymond H. Stallings, senior executive vice-president of Great Southern. "It isn't just the policy. It's the fact that we have a support program — the computer program — that works with the policy. They can't be separated."

Great Southern, based in Houston, markets insurance products in 38 states. In 1981, the company wrote more than $1 billion of individual life insurance, up from $650 million in 1980.

New sales of individual life insurance have continued to increase significantly in 1982 and are expected to reach $1.5 billion by year-end.

Over 4000 Plans Offered

Great Southern agents use the Keypact terminal made by Computone Systems, Inc., an Atlanta-based company that also provides financial planning and life insurance policy information services. The company has an executive data base of over 4,000 life insurance plans offered by more than 240 life insurance companies, including Great Southern, and an applications software library of more than 660 financial planning and policy illustration programs. All may be accessed on a time-sharing basis via telephone using the company's terminals.

The Keypact terminal features a data entry system that includes two rows of thumbwheel switches, each of which may be individually set at numerals 0 through 9. A removable plastic template, one for each program, defines each switch and identifies the input number to be supplied by the agent and client.

Great Southern began using Keypact terminals in January 1981. Introduction of the terminal was prompted by the company's decision to develop and market a new insurance product, Universal Life, which represented a radical departure from the traditional life insurance products Great Southern had marketed since 1909.

Universal Life Plan

Universal Life insurance is an adjustable whole life insurance plan. Universal Life offers current high interest rates on the cash value portion of the policy. Premium payments and the amount of insurance are flexible and may be tailored to meet changing needs over a policy-holder's lifetime. Premiums are put to work in money markets or other high-yielding investments.

Industry leaders see Universal Life, still in its infancy, eventually converting 70% of the conventional whole life market. So far, only 5%, approximately, has been converted.

"Universal Life is not a

(Continued on SR/52)

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Firm Provides 80% of Agents With Terminals

(Continued from SR/51)

product you can sell from a rate book," Stallings said, because conventional rate books cannot illustrate the flexibility of these policies, their ability to be tailored and retailored or the current and constantly changing interest rates.

Thus, Great Southern faced two problems: Its agents would have to write individual proposals for each client and also, they would need some means of writing those proposals.

Requesting proposals from the home office — the usual procedure after discussing policies with clients — would require a turnaround time of several days.

Furthermore, tailoring the policy to meet a client's needs and goals often requires more than one proposal to close a sale — "too long a time lag," said Tom Brophy, executive vice-president who was the senior vice-president in charge of DP and information systems at the time of the introduction.

Computerized Illustration

The company turned to computerized illustration, selecting Computone's Keypact terminal.

"There were no practical alternatives to Computone's product at the time," Brophy said. "The Keypact is portable, can illustrate proposal after proposal in front of the client, eliminates the turnaround time of going to the home office and is affordable."

Brophy said that service bureau operations and microcomputers were possible alternatives to the Computone terminals. Yet in late 1980, when Great Southern decided on Computone, these were not viable alternatives, as Universal Life proposals were not available, he said.

Microcomputers were not as portable as Computone's Keypact and equipment costs averaged five times Computone's then-current $2,500 price range.

"Agents could not adequately afford the micros," Brophy said.

Positive Reaction

"My positive reaction to the Computone demonstration was based on my strong feeling that any company with a marketing orientation wants to provide its field force with some kind of communications tool that eliminates the U.S. Mail, Federal Express or other communications service and gives its agents immediate access to information they need to do their jobs better," he said.

"The fact is, we had been telling our field force that in three to five years we were going to give them some kind of communications system with the home office. The way I evaluated the Computone system, I saw it as a tool which, from the marketing side, performed many of the tasks I felt were important, particularly with the lifetime product."

Under a plan that provides terminals free of charge to the agents, other than actual on-line use charges, Great Southern has purchased "more than a half million dollars worth of terminals," Stallings said.

Agents obtaining a minimum level of production for a six-month period continue to possess the Computone terminal at no charge — other than for on-line use — for the next six months. Monthly terminal rentals are charged if production goals are not met.

The monthly use charge averages about $70 for each agent, reported William Robeson, Computone's president, with each agent connecting to Computone's data base for about an hour a month. Connect time per policy illustration averages about three minutes.

Primary Attraction

The terminal is a "primary attraction" in recruiting experienced agents, Stallings said. General agents contracted by Great Southern average seven years' experience. "Among the primary attractions for agents in joining us is that we have the backup of a proven computer system for selling Universal Life with Computone."

Initially, general agents receive 1½ days of training on the terminals, part of the three-day sessions held twice a month at the company's home office in Houston for new agents. Before the terminals were introduced, training sessions traditionally lasted two days. The training sessions are conducted by advanced underwriting personnel taught by Computone.

Also, every agent receives a tuition grant certificate redeemable for four days of formal schooling at Computone's education center in Atlanta. The computermaker also runs one-, two- and four-day seminars across the country.

"All together, it's the strongest support any company in the field gives its field force," Stallings said. "And it gives our agents an edge on the competition."

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Bring Long-Distance Rates Down

Bell Breakup to Boost Local Rates: Analyst

By Phil Hirsch
CW Washington Bureau

NEW YORK — Breakup of the Bell system will force local exchange rates up and long-distance charges down, a telecommunications industry analyst for a prestigious Wall Street brokerage firm said here recently.

John Bain of Lehman Brothers Kuhn Loeb, Inc. added that the impending divestiture of AT&T will also make the acquisition of communications services and equipment more complex; for example, users will typically have to deal with multiple suppliers and will have to develop ways of preventing finger pointing when services/systems fail.

Bain was among the speakers at a seminar held here by the Securities Industry Association, whose members include most of the nation's leading brokers and brokerage firms. The other speakers included Archie McGill, AT&T's vice-president for business services; former Federal Communications Commission Chairman Richard Wiley, now a private attorney; and Gary Epstein, chief of the commission's common carrier bureau.

Long-distance rates will come down, according to Bain, because they will no longer subsidize the costs of local-exchange operations. Instead, he explained, each telephone operating company will levy a "local-exchange access charge" on its long-distance carrier customers who will, in turn, pass this charge on to *their* customers. The access charge, covering use of the local circuits and switching facilities needed to complete long-distance calls, will add to whatever the end user is already paying directly to his local telephone company for local service.

Users also will have to adjust to dealing with multiple vendors, Bain said. This is partly because of the AT&T/Justice Department settlement, which will require the user to obtain local service from one entity and long-distance service from another. But dealing with multiple vendors will also be desirable if the user wants to exploit new technology and reduced rate offerings. Bain said he expects the long-distance communications market to become highly competitive; he believes that, as a result, we will see a hot rate war among AT&T, the specialized carriers and resale carriers.

Regarding technology, Bain indicated that local-area networks will become more popular. One reason is the expected increase in telephone operating company charges for installing and moving terminal equipment. (This will be a part of the increase in local communications charges discussed above.)

A major benefit of local-area networks, Bain pointed out, is that they make terminal installations and reinstallations simple and cheap.

Another possible inducement to install local-area networks, he added, is that they supposedly provide an effective way of interconnecting personal computers.

Bain said that during the next few years, he expects the number of personal computers and microcomputerized terminals installed in offices to increase tremendously.

Packet Controller Supports Wang, IBM, Lanier WP Systems

DALLAS — Intecom, Inc. has introduced a packet controller said to allow selected word processors from different manufacturers to communicate with each other. It is part of the company's Integrated Business Exchange (IBX S/40).

The Word Processing Intenet Packet Controller (WP IPC) supports systems manufactured by IBM, Wang Laboratories, Inc. and Lanier Business Products, Inc. It is a shared converter so that existing text files on supported dissimilar word processing systems can be converted on demand for distributed use, a vendor spokesman said.

Each WP IPC supports multiple word processors and converts data, as well as control codes, in real-time mode. Since the system is a shared resource of the IBX S/40, it is accessible by all users as needed.

The system is available for approximately $10,000 from Intecom, 601 Intecom Drive, Allen, Texas 75002.

DG/SNA Gets Remote Job Aid

WESTBORO, Mass. — Data General Corp.'s Information Systems Division has unveiled SNA/RJE, a remote job presentation facility, as an addition to its family of DG/SNA products.

SNA/RJE emulates IBM 3770 remote batch processing devices, DG claimed. It lets users of Eclipse information systems transfer files to and from an IBM host.

SNA/RJE users can submit programs to an IBM host for processing or collect data from files resident on Eclipse systems. This file concatenate feature lets an Eclipse system running DG/SNA gather several files from other Eclipse systems in the vendor's Xodiac network and send them as one transmission, rather than separately, to an IBM host.

Counting SNA/RJE, DG/SNA includes four software modules: DG/SDLC provides the communications protocol, DG/SNA controls data flow and provides a local applications interface and SNA 3270 handles terminal and printer emulation.

DG/SNA software runs under the vendor's AOS and AOS/Virtual Storage on Eclipse 16-bit and 32-bit information systems.

The initial license fee for SNA/RJE is $2,000 and a subsequent license costs $1,500, DG said from 4400 Computer Drive, Westboro, Mass. 01581.

Will '82 See Comprehensive Bill?

NEW YORK — Former Federal Communications Commission (FCC) Chairman Richard Wiley predicted at the Securities Industry Association (SIA) meeting here recently that there will be no comprehensive communications legislation this year; he added that the prospects for a bill next year will depend on whether the present coalition of AT&T competitors can hold together.

He also believed that AT&T, which was instrumental in killing this year's House effort to rewrite the Communications Act of 1934, will continue to oppose the idea now that the antitrust case is settled. The phone company, according to Wiley, is "clearly the big winner" of that battle, and the Bell operating companies are the big losers.

The operating companies are left with the least profitable parts of the communications business, while AT&T has been unleashed into the most lucrative markets, such as remote data processing, provision of other on-line "computer communications" services and computer-based terminals.

One such terminal is the Dimension Private Branch Exchange (PBX). AT&T was among a small group of companies that exhibited its wares at the SIA meeting, and four recent enhancements to the Dimension PBX dominated the phone company's booth: a distributed communications system, data switching capability at speeds up to 9.6K bit/sec, message center service and energy management service.

The AT&T speaker, Archie McGill, mentioned them as examples of the enhanced offerings that AT&T, through its American Bell, Inc. (ABI) subsidiary, is developing. Regarding Advanced Information Systems/Net 1000, the first ABI service offering, McGill said it "will do for data communications what the switchboard did for voice communications. Just as voice communications has become universal, so will data communications."

McGill also agreed with John Bain, a Lehman Brothers Kuhn Loeb, Inc. securities analyst, who said that presently offered teleconferencing services, presumably including AT&T's Picturephone Meeting Service (PMS), are not cost-effective substitutes for travel. But he quickly added that PMS is one of a family of present and future AT&T offerings designed to support teleconferencing.

In response to a question from Computerworld, McGill said that there is probably a need for the FCC to reconsider the Second Computer Inquiry Decision. One reason is that divestiture of the Bell operating companies, in the wake of the antitrust case settlement, reduces the danger of cross-subsidization.

VT-100s Gain 3270 Emulation

MIAMI — Innovative Electronics, Inc. has introduced a communications processor said to convert a Digital Equipment Corp. VT-100-compatible terminal into a full-function IBM 3277-1, 3277-2, 3278-1, 3278-2 terminal communicating with the IBM host using the Ebcdic binary synchronous communications protocol.

The MC-80/600-01 communications controller performs full-screen mapping, and data is displayed on the asynchronous Ascii terminal that is the same as an IBM 3277/3278 display station.

All keyboard functions are supported, including vertical and horizontal cursor movement, erase, insert, delete and 24 program function and program access keys. Status information is displayed at the bottom of the display.

The price of the basic unit is $1,745 from Innovative Electronics, 4714 N.W. 165th St., Miami, Fla. 33014.

ATMs Linked To Plus System

DAYTON, Ohio — The Automated Teller Machine Services Group has introduced a software package said to enable NCR Corp. automated teller machines (ATM) to interface directly with the Plus System network, located in Denver.

ATM-Plus is the package that allows users of ATMs to interface with the Plus System, which has 34 of the nation's largest banks as members. This reflects combined assets of $300 billion, a spokesman for the group said.

The package is available for $2,800/configuration, a spokesman said, from the Automated Teller Machine Services Group, 245 W. Elmwood Drive, Dayton, Ohio 45459.

Terminal Lock Unwrapped

GREAT NECK, N.Y. — Time Lock, Inc. has unveiled a terminal security lock designed to limit unauthorized use of computer terminals.

The DL-100 utilizes a high-security Medeco Key Lock to disable transmit data (for CRT terminals) or receive data (for printers). Without interrupting ac power to the terminals, the DL-100 reportedly provides visual confirmation of secure status for EIA RS-232 communications-equipped terminals.

It costs $150 from Time Lock at 87 Water Mill Lane, Great Neck, N.Y. 11021.

IEEE-Compatible

Harris Interface Bus Out

FORT LAUDERDALE, Fla. — Harris Corp. has introduced an interface bus said to combine a hardware implementation with full software support. It is an 8-bit parallel general-purpose interface bus.

The Model 8476 IEEE 488 bus controller very large-scale integration (VLSI) integrated circuit is utilized on a daughter board of the recently introduced Harris Communications Network Processor (CNP).

The Model 8476 reportedly will interface with IEEE-compatible laboratory devices such as analyzers, scopes, testers, small computers and other digital and analog equipment directly to the Harris CPU.

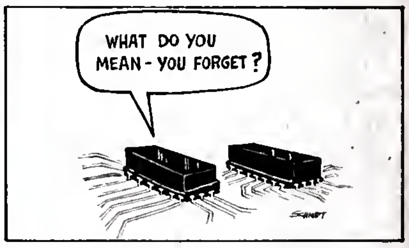
Available in December, the interface bus CNP daughter board, including software, is priced at $2,500. More information is available from Harris Corp., Computer Systems Division, P.O. Box 6200, 2102 W. Cypress Creek Road, Fort Lauderdale, Fla. 33310.

Syfa Users Get 'Synet' Software

IRVINE, Calif. — Computer Automation, Inc. has introduced a software package that enables users of the company's Syfa Network Processors — utilized in IBM's Systems Network Architecture (SNA) networks with host IBM mainframe computers — to gather files such as text, programs or data from remote Syfa node processors. It can assemble them in libraries maintained on the host and later selectively redistribute them throughout the network.

The Synet is said to enable the SNA networked manager to duplicate IBM Host Command Facility and Distributed System Executive functions.

It is available to U.S. customers for a one-time fee of $8,200 from Computer Automation, Commercial Systems Division, 2181 Dupont Drive, Irvine, Calif. 92713.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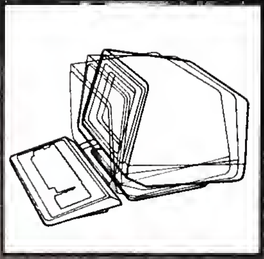

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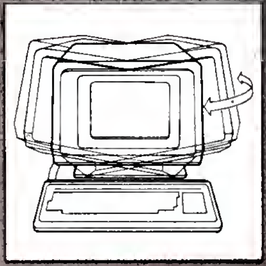

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Sidereal Desktop Terminals Bow

PORTLAND, Ore. — Sidereal Corp. has introduced two desktop terminals for its line of multiport telecommunications terminals. Both terminals have two ports that can be configured from any combination of telex, TWX, direct-distance dialing or international record carrier telex.

The Micronet 20 is said to feature a programmable keyboard, simple installation archival random-access memory, electrical erasable programmable read-only memory, integrated electronic diagnostics and internal intelligent modems.

The Micronet 25 has all the features of the Model 20, with the addition of built-in single or dual 5¼-in. floppy diskettes that add 160K bytes of 320K bytes of mass storage, the vendor spokesman said.

The Model 20 prices start at $3,310; the Model 25 starts at $3,815. More information is available from Sidereal Corp., 9600 S.W. Barnes Road, Portland, Ore. 97225.

Personal Computing Added To Service for Stockbrokers

TRUMBULL, Conn. — Bunker Ramo Information Systems, a division of Bunker Ramo Corp., has announced that it will enhance its data processing system called Market Decision System 7, which allows stockbrokers to use desktop terminals to access a remote data base located here for stock quotations.

The new system, called Intellimation 10, includes the installation of a microprocessor into the desktop computer.

This will allow stock brokers using this network to use their terminals as personal computers while on-line to the company's data base, a vendor spokesman said.

Intellimation services will be leased to users at a base $300/mo with the overall price varying with the number of terminals and software selected.

Selling price on the desktop computers will start below $5,000, according to the vendor. More information is available from Bunker Ramo Information Systems, 35 Nutmeg Drive, Trumbull, Conn. 06609.

Switching Device Manages Complex Data Networks

NORWALK, Conn. — Data Switch Corp. has introduced a device which it claims utilizes large-scale switching matrices and simplified controls in order to manage complex data communications networks.

The XY-MAX Interactive Communication Director System features up to 16 matrices, each having 131,072 crosspoints, that can total more than one million RS-232C/V.24 crosspoints to provide greater line/port switching capacity, a vendor spokesman said.

Among its features are high-speed reconfiguration, fully transparent data paths at up to 19.2K bit/sec, statistical line-management reporting software, 10.4M-byte configuration history file and interactive color command consoles, the spokesman for Data Switch reported.

The XY-MAX is available for between $109,200 and $320,400 from Data Switch Corp., which is located at 444 Westport Ave., Norwalk, Conn. 06851.

Rixon Mux Enhanced

SILVER SPRING, Md. — Rixon, Inc. has announced that its DCX statistical multiplexers now provide 2,400 automatic bit/sec rates and speed conversion capability. Dial-in users with 2,400 bit/sec terminals can now access Rixon DCX multiplexer ports. Operation is identical to slower dial-in speeds, a vendor spokesman said.

By leaving host ports at the desired operating speed, varying speed dial-in users may access the host via multiplexer ports. A flow control system allows DCX to buffer data and control flow into multiplexer ports without loss of data.

The line of DCX multiplexers ranges in price from $1,750 to $15,000 from Rixon Inc., 2120 Industrial Pkwy., Silver Spring, Md. 20904.

Prentice Cuts P-201C Price

SUNNYVALE, Calif. — Prentice Corp. has enhanced and lowered the price of its Bell Laboratories 201C-compatible modem.

The P-201C synchronous modem operates at 2,400 bit/sec in full duplex mode over private four-wire circuits and in half duplex or simplex modes over two-wire private and dial-up lines, according to a spokesman for the vendor.

Features of the microprocessor-based P-201C include an integral voice/data switch, Federal Communications Commission certification, ring-detect and answer-back capability enabling automatic data transfer from remote sites and selectable clear-to-send delays, the vendor spokesman said.

Single unit prices of the P-201C are $700 for the rack-mount model and $795 for the stand-alone model, the spokesman said.

This is a reduction of $250 off the price of the 201-compatible modem. More information is available from Prentice Corp., which is located at 266 Caspian Drive, Sunnyvale, Calif. 94086.

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Cambex Unveils Memory for 3033s

WALTHAM, Mass. — In response to IBM's recent reduction in memory prices, Cambex Corp. has announced an add-in memory system for IBM's 3033 series mainframes. Called Stor/3000 Version E, the memory is available in memory sizes of 4M, 8M and 12M bytes.

The Version E memory, which is a derivation of the firm's earlier Stor/3000 memory, is compatible with IBM 3033 Models U, A, M, N and S. Each module is priced at $40,000 per 4M-byte module, approximately 30% less than comparable IBM memory units, the vendor said.

According to Cambex, Version E costs less because the boards are single-sided and directed only to a specific processor type.

Also, the boards are only available in 4M-byte modules.

Like the original Stor/3000, Version E uses 64K MOS random-access memory chips for maximum storage density. The address buffer and memory module cards plug directly into the CPU backplane, cohabiting with or replacing the existing memory cards of the IBM system, the company said.

Regular versions of the Stor/3000 memory systems are still available in 1M-byte increments or larger for regular and extended configurations of IBM series 370/158, 370/168, 3031, 3032 and 3033 computers, including extended versions over 16M bytes.

Shipments of the Stor/3000 Version E will begin in October with normal delivery time from 30 to 60 days from Cambex, 360 Second Ave., Waltham, Mass. 02154.

Plotter Features Buffer Memory

LANSDALE, Pa. — Numonics has announced a low-inertia plotter, the 5412, which offers a 3.9K-byte memory for data buffering.

The 11 in. by 17 in. format plotter has a built-in Ascii 96-character font and the capability of creating up to 36 special markers, a company spokesman said. In addition, the device has built-in motor speed for x and y axes that continuously changes while arcs are plotted.

The unit's standard buffer memory has enough storage for up to 13 pages of Ascii characters. The plotter accepts data at transmission rates from 300 to 19.2K bit/sec, the vendor reported.

The single-unit plotter is priced at $1,295, including a standard RS-232 interface, from Numonics, 418 Pierce St., Lansdale, Pa. 19446.

Canadian Machine Offers 16-Bit CPU, Microcode

MARKHAM, Ont. — Geac Computers International, Inc., a Canadian-based manufacturer of high-speed computer systems, has introduced a 16-bit transaction-oriented machine that offers bipolar bit-sliced processor technology and microcode memory and control storage.

The System 2000 has up to 512K bytes of memory, expandable in increments of 128K bytes, and up to 96M bytes of hard disk storage with the addition of an external drive. The system reportedly offers a 320 nsec access time and a memory cycle time of 400 nsec for the read cycle and 260 nsec for the write cycle. Certain locations of the system's memory are also reportedly protected via microcode.

The System 2000 is available in two versions, both offering different I/O communications capabilities. The 2000A has four asynchronous/synchronous serial ports and four serial ports that can accommodate the firm's Model 8300A terminals, which can be located a minimum of 100 feet from the computer. The 2000B offers asynchronous/synchronous ports, a spokesman said.

The system has an I/O rate that is software-selectable up to 19.2K byte/sec, can handle program interrupts and support a variety of protocols including IBM 3780 and the Canadian Datapac network.

The system's Winchester disks have a data transfer rate of 6.45M byte/sec and an average latency time of 8.33 msec. Seek times for information off the disks range from a minimum of 50 msec to 100 msec, the spokesman claimed.

The system's tape drive operates at 30 in./sec, is capable of bidirectional activity and has a search/rewind speed of 90 in./sec. It records at a density of 6,400 bit/in. with a four-track operation. The system also includes a cartridge-type magnetic tape drive to back up the Winchester disks.

Basic and Zopl

Software for the System 2000 includes industry-compatible Basic, and Zopl, a Geac proprietary language that is used for the operating system, compilers, utilities and other systems software. All of the software is multiuser and multitasking. A batch-operated subsystem is also available.

The System 2000 is compatible with the firm's two other computers — the 6000 and 8000. The firm's computers are aimed at such applications as banking, library, publishing and insurance.

The basic System 2000 costs $33,150. Additional information can be obtained from the firm's headquarters at 350 Steelcase Road W., Markham, Ontario L3R 1B3 or from the company's U.S. office at 8332 Osage Ave., Los Angeles, Calif. 90045.

Intel Chip Combines Micro With CP/M

SANTA CLARA, Calif. — Intel Corp. announced it has developed a semiconductor chip that combines its iAPX-86 16-bit microprocessor with a compatible version of Digital Research, Inc.'s CP/M operating system.

The device, called the 80150, combines both hardware and software on a single piece of silicon. Potential uses for the chip include the construction of compact personal computers, intelligent workstations and "diskless" computers, an Intel spokesman said.

The 80150 is a processor extension for the firm's industry-standard 8086, 8088 and recently introduced 80186 microprocessors, the first two of which are the leading processors in such computers as IBM's Personal Computer and Displaywriter, Digital Equipment Corp.'s Rainbow and Victor Business Products, Inc. Model 9000. CP/M is widely considered to be a de facto standard in the microcomputer industry.

The benefits of embedding CP/M in a processor chip include: lower hardware and software design cost, resulting in a reduced cost to the user; reduced board space and interconnect wiring; and increased system reliability. Also, since the CP/M operating system is built into the Intel chip, the end user does not have to license the use of the Digital Research operating system, the spokesman said.

Another possible use for the chip is in the construction of so-called "diskless" computer systems that utilize the memory capabilities inherent to the 80150 chip. Blocks of random-access memory available on the chip can be used like a standard floppy disk. Files can then be opened and closed, programs stored and applications loaded into this memory area, the spokesman noted.

The 80150 marks the second time that Intel has embedded operating system software into one of its semiconductor products. The first was the iRMX-86-based 80130, introduced in 1981.

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For Science, Engineering Use

Dacu Links IBM 4300 to Peripherals

RYE, N.Y. — Users of IBM's 4300 series processors can now use graphics terminals, plotters, minicomputers, sensors and laboratory instruments developed by non-IBM vendors by using a Device Attachment Control Unit (Dacu) announced here last week.

The Dacu consists of an emulator and an IBM Personal Computer. It attaches to either a 4331 or 4341 block multiplexer channel and allows users to attach peripherals compatible with the RS-232C and Digital Equipment Corp. Unibus communications protocols. The Dacu was designed primarily for scientific and engineering applications, however some commercial users can use the device as well, IBM said.

While the Dacu allows users to attach non-IBM devices, IBM said some software adjustments may be necessary to make those devices truly compatible with the 4300 system. Those adjustments can be made via the Personal Computer, the vendor said.

The Dacu offers four direct memory access ports with a maximum transfer rate of 2M byte/sec. The Dacu also offers two RS-232C ports for attachment of serial or asychronous communications devices. The maximum transfer rate for RS-232C ports is 19.2K byte/sec, an IBM spokesman said.

The Dacu is connected to the 4300 series processor via a block multiplexer channel with a maximum transfer rate of 1.9M byte/sec, according to an IBM spokesman.

The Dacu was designed by IBM, however the unit will be manufactured by another firm. A spokesman declined to say which firm will manufacture the device, but he did say the unit would be built in the U.S.

A basic Dacu costs between $16,000 and $19,000 and comes with an IBM Personal Computer with 48K bytes of main memory, a 5¼-in. disk drive, a monochromatic display terminal, printer and the Personal Computer's PC DOS operating system. The device will be available in the fourth quarter, IBM said.

Testers for EIA, Centronics Out

LITTLE SILVER, N.J. — An interface tester for a Centronics Data Computer Corp. or compatible printer and an Electronics Industries Association (EIA) interface and bit error-rate tester have been announced by Nu Data Corp.

The Model 921-R2-F error-rate tester includes an on-board generator to test terminal equipment as well, the company said.

The code is selectable as Ascii and may be set to a sentence length of either 64 or 128 characters.

The Model 936 printer interface offers direct access to all 36 interconnecting leads and constant light-emitting diode monitoring of all signal leads, the company claimed. It is interface-, battery- or ac adapter-powered, a spokeswoman for the vendor said.

The Model 921-R2-F bit error-rate tester is priced at $740 and the Model 936 printer interface at $189 from Nu Data Corp., P.O. Box 125, 32 Fairview Ave., Little Silver, N.J. 07739.

Monitor Offers Raster Display

SAN DIEGO — Superset, Inc. has introduced a raster color display monitor that reportedly attaches to the company's Portable Graphics Mainframe to provide programmable resolution RS-170/RS-343 RGB color video output capability.

The CD-2 consists of a 19-in. monitor, channel interface, 393K-byte memory, video display board and 48-bit Fortran processor, all of which provide an auxiliary mainframe available for Fortran processing when not in use as a video display, the vendor claimed.

Other features include a software-operated cursor and color palette, color blink and an interface to allow synchronization with external video for overlaying video on mainframe-generated graphics, the company said.

The CD-2 raster color display monitor is priced at $16,500, including the required parallel channel, from Superset, Inc., 11035 Roselle St., San Diego, Calif. 92121.

Turnkey System Aids Analysts

CONCORD, Mass. — GWP Corp. has introduced a new turnkey workstation designed for preparing, revising and printing a variety of diagrams employed in structured methodologies for systems analysis and design.

The Analyst's Workstation reportedly features more than 40 standard symbols and can produce a wide range of planning, scheduling and reporting aids such as gantt charts, bar charts and organizational charts.

This product includes dual floppy disk storage, printer, RS-232C ports for data communications, software and system desk. It costs approximately $20,000, the vendor said from 336 Baker Ave., Concord, Mass. 01742.

Terminal Offers Color Graphics

TOKYO — Nippon Computer Co., Ltd. has announced the NJC-C1421, a color graphics display terminal designed for business graphics and computer-aided design and manufacturing applications.

Features include a 14-in. high-resolution screen, a 1,024 by 780 dot resolution and up to 27 colors.

The unit costs $6,995. The terminal will be available in the U.S. in late October, the vendor said from the Naito Building, Nihonbashi Hamacho 2-25-1, Chuo-ku, Tokyo 103, Japan.

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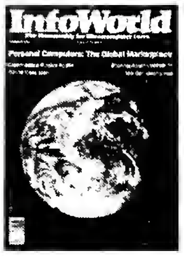

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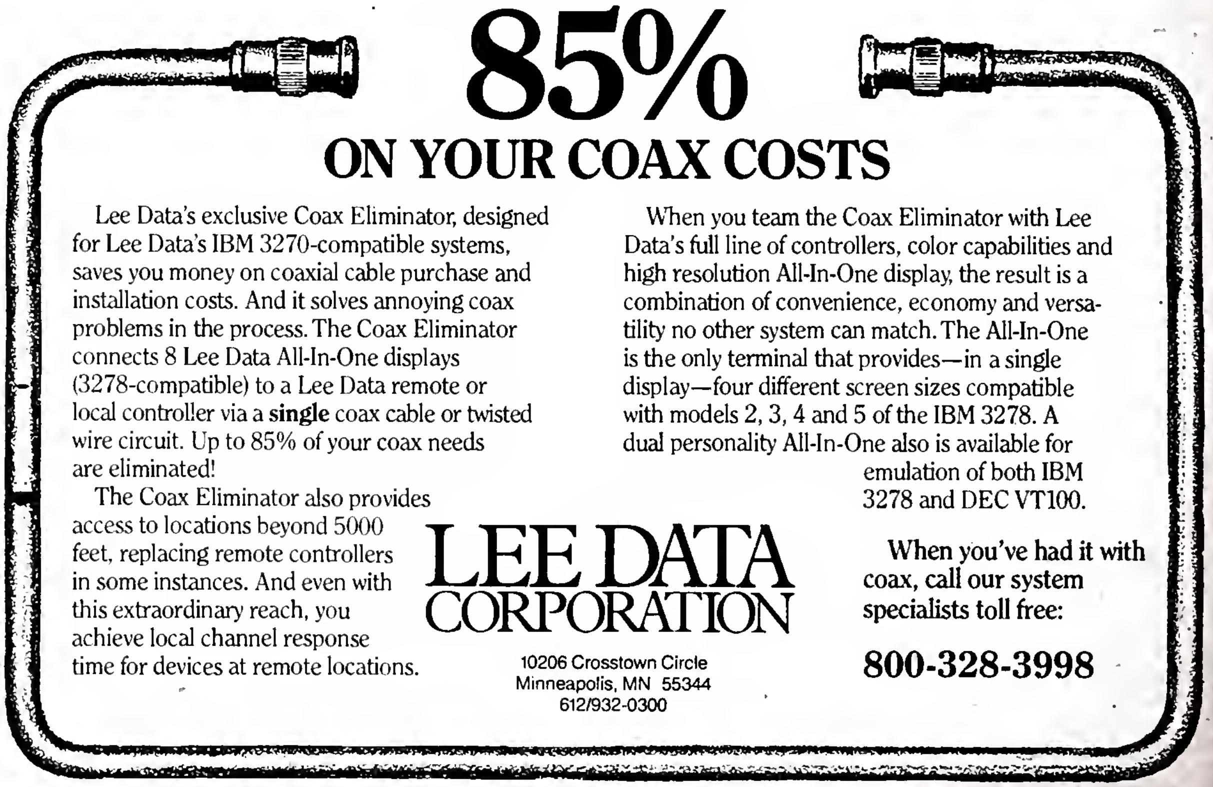

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Mark V. McKee (left), Troy School District computer operations supervisor, and Charles A. Morse, treasurer, examine a report.

Disk is inserted into the System 80's diskette reader. One reader is autoload and the other manual.

More Time Devoted to Students

Mini Helps School District Cut Paperwork

TROY, N.Y. — Declining enrollment, reduced aid, increasing paperwork and other administrative red tape are not what most people associate with those carefree school days. But they are an all-too-real part of today's education system.

Unfortunately, these problems, plus the reporting demands of local, state and federal officials, tie up administrative staffs to the point where the students and the educational program suffer.

The Troy School District is attempting to ease some of these conditions by using a Sperry Univac System 80 minicomputer, an interactive system that is designed for multiuser, on-line input and inquiry applications.

Students Get More Time

Basically, the system lets school administrators handle the rapidly increasing amount of paperwork and devote more time to the students, said treasurer Charles A. Morse. It also allows each department to maintain and update its own records, while remaining a part of the total computer system.

Data processing is not a new experience at the Troy School District. In fact, the district — which purchased its first Univac computer in 1962 and upgraded it in 1969 — is one of the few school districts in New York State to operate its own computer system outside of the state's Board of Cooperative Educational Service (Boces). Most school districts go through Boces for their computer services, Morse explained.

"We wanted control of our data and to write our own programs, make changes when we want, input when we want and access data when we want," he stated. "If you go with Boces, you do things their way."

Locked into System

Prior to acquiring the Univac System 80, the Troy District was "locked into" a Univac 9200 computer, a punch-card-oriented system. This system was not only outdated, but required expensive maintenance, the costs of which were continually rising, Morse pointed out. The only solution: install a new computer system.

The Troy District installed the System 80 Model 5 in March 1981. It is presently linked to 11 CRT terminals and there are plans to add four more in the near future. It has 1M byte of memory and includes three disk drives, offering a total of more than 350M bytes of storage; two diskette readers; two magnetic tape drives; a card reader; and a printer.

The Troy computer serves a district with a nearly $20 million budget and 6,000 students, 650 full-time staff in one high school, a middle school and six elementary schools. The data processing department operates within a budget of $125,000 per year, a level that — except for salaries — has not risen in three years, Morse boasted.

All of the district's former card-oriented programs have been rewritten from an RPG format to Cobol — a task that Morse claims took less than a year.

"Each application is written to make it convenient for the user who never saw a computer," he stated.

Two-Stage Approach

When implementing the system the district took a two-stage approach. First, the administrators concentrated on the business functions such as payroll, purchasing, budgeting and the school board agenda.

The second phase tied in the school functions, including student scheduling, class changes, grade corrections and attendance reporting. It is this last function that is more visible to the students and the teachers.

Finally, Morse also sees the computer system as an on-line teaching tool for the mathematics and science departments in the high school and middle schools and for use in computer programming classes.

DEC Cuts Prices Up to 46% on VT18X Option

MAYNARD, Mass. — Digital Equipment Corp. has reduced prices on its VT18X Personal Computing Option by up to 46%.

The VT18X Option can be used to convert DEC's VT100 video terminal into a personal computing system that runs Digital Research, Inc. CP/M-based programs. The price cut stems from DEC's recent introduction of the CP/M-based Rainbow 100 personal computer.

The basic VT18X consists of a module with a Zilog, Inc. Z80 microprocessor and 64K bytes of memory mounted within the VT100 cabinet, a dual 5¼-in. minifloppy disk drive providing 160K bytes of storage and connecting cable, documentation and diagnostic routines on a minifloppy disk.

The VT18X now costs $1,295, down from $2,400. An optional add-on dual minifloppy disk drive now costs $695, from $1,275. The CP/M operating system for the option has been reduced to $200 from $250. DEC is located at 146 Main St., Maynard, Mass. 01754.

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S-100 Microangelo Enhanced, MA512 Retail Price Cut 40%

RESTON, Va. — Scion Corp. has announced an enhanced version of its S-100 Microangelo single-board graphics computer, the MA520.

At the same time, the company announced a 40% reduction in the retail price of its MA512 computer from $1,495 to $895.

The MA520 computer reportedly offers an additional 32K-byte buffer for secondary images or user-defined functions for a total of 64K bytes, additional firmware space to 12K bytes, up to 25% faster code execution and I/O port decoding.

With the new Screenware Plus Microangelo-resident operating system, the system draws points, lines, circles, elipses, arcs, pies with sections, divided circles, rectangles and regions, according to a spokesman for the vendor.

Other features include panning the screen left, right, up or down, with or without wraparound; sending formatted screen images to printers including IDS, Inc.'s Paper Tiger and Prism and Epson America, Inc. printers; and offering smart vectors, the spokesman added.

These smart vector are said to stop drawing when they encounter a pixel in the opposite state of the starting pixel of the vector and return to coordinates of the collision.

The MA520 with Screenware Plus retails for $1,695.

Scion Corp. is headquartered at 12310 Pinecrest Road, Reston, Va. 22091.

Packaged Memory Unit Out for PDP-11/23 Users

SUDBURY, Mass. — EEC Systems, Inc. has announced a complete packaged-memory expansion unit for users of Digital Equipment Corp. PDP-11/23 computer systems.

The unit allows the memory on DEC RSX-11M-based Q-bus computers to be expanded up to 4M bytes, the company reported. The basic expansion kit includes a 512K bytes of parity and control-status-register clearpoint MOS memory with additional user-installable memory available in 512K-byte increments.

In addition, supplied with the hardware is the firm's Catch-23 software product that reportedly enables all direct memory access controllers in the host system to function with the 22-bit expansion memory, the vendor said.

The basic unit costs $5,000 including credit for the existing processor backplane. Price excluding the credit is $6,500 with additional memory priced at $1,500/512K bytes with clearpoint or DEC memory from EEC Systems, Inc., Mill Brook Park, 327 E. Boston Post Road, Sudbury, Mass. 01776.

Turnkey Based On Datamaster Out for Retailers

ROCKY MOUNT, N.C. — Distribution Management Systems Corp. has announced a point-of-sale distribution turnkey system based on the IBM System/23 Datamaster.

Counter/Connection is intended for small- and medium-size retailers/wholesalers, with special features geared towards truck-parts service industries. This product reportedly provides a remote stand-alone system for point-of-sale invoicing, accounts receivables, inventory management, purchasing/receiving, sales analysis, accounts payable and general ledger.

Counter/Connection software is written in Basic. The vendor will provide interface programming to the IBM System/34 and System/38 host systems upon request.

This turnkey product ranges in price from $17,900 to $33,900. The software alone costs $7,900 to $9,800, depending upon configuration. Leasing options are also available at $400 to $800/mo for the turnkey. The vendor can be reached through P.O. Box 2763, Rocky Mount, N.C. 27801.

Micro Turnkey Out For Patient Billing

CANOGA PARK, Calif. — A microcomputer-based turnkey system that handles patient billing, insurance claims and medical office forms and reports has been developed by Datamed Systems Corp.

The Medical Office Computer System features a networking capability with full-record locking, according to the vendor. Up to 16 remote terminals and printers can be linked.

A basic system, including a Televideo Systems, Inc. 802H microcomputer, a 100-char./sec dot matrix printer and all software, costs "just under $15,000," a spokesman said from 7301 Topanga Canyon Blvd., Canoga Park, Calif. 91303.

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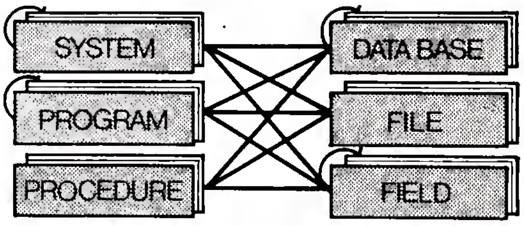

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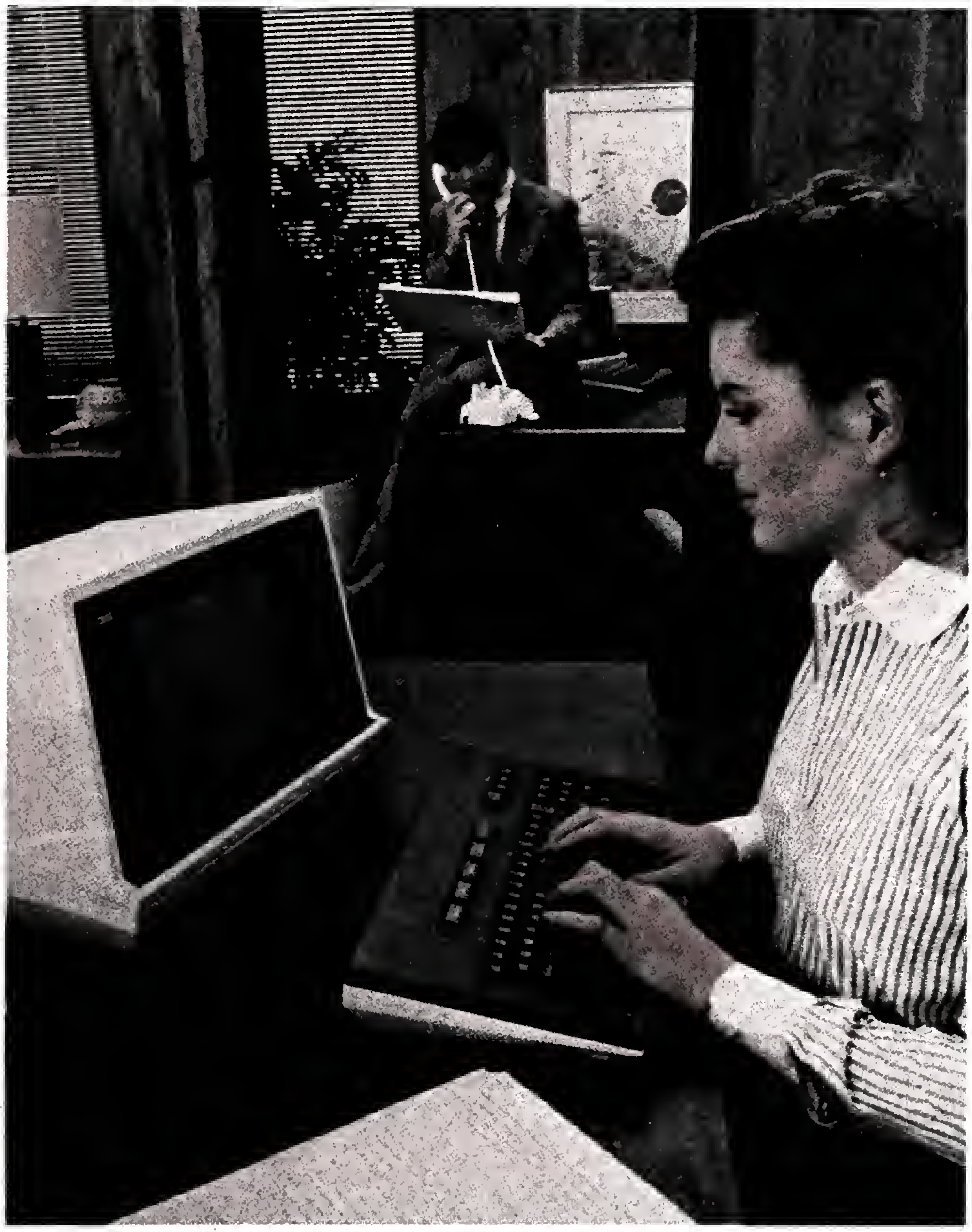

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ETR Personal Micro Bows For Business Applications

WILMINGTON, Calif. — ETR, Inc. has announced the ETR Star System, a personal business microcomputer. The ETR Star System comes with 1.6M bytes of storage on dual 5¼-in. drives, a 12-in. commercial green phosphor terminal with detachable keyboard, 80 char./sec dot matrix printer and complete on-board software on a single disk.

The system includes a real-time clock, parallel ports for printer hookup and a built-in modem. The system's Digital Research, Inc. CP/M software is user-programmable in simple English-language commands and includes menu control, word processing, spreadsheet and relational data base applications.

Base price is $5,950 from ETR at 1316 N. Avalon Blvd., Wilmington, Calif. 90744.

Evotek Winnies Get Controller

FREMONT, Calif. — Evotek, Inc. has announced a storage module drive (SMD) controller interface capability for its ET 5800 line of 5¼-in. Winchester disk drives.

The SMD controller provides direct memory access capabilities and fits into most small computer systems, according to a vendor spokesman.

The controller reportedly allows higher data transfer rates from the disk drive to the central processor.

The controller costs about $1,000 and will be available starting in April, from the vendor located at 1220 Page Ave., Fremont, Calif. 94538.

Turnkey System Out for Service Station Dealers

ATLANTA — A turnkey hardware and software package specifically designed for service station dealers has been announced by Marcoin Business Management Services Corp.

The heart of the system is the Northstar Corp. Advantage microcomputer featuring over 700K bytes of memory stored on dual 5¼-in. diskettes and 64K bytes of user memory. The micro also has a wide range of graphics capabilities and features as well as an 87-key control panel, the company said.

The software offered has been field tested in more than 80 stations over the last two years and includes programs for daily checkout, accounts receivable, profit and loss, payroll and inventory, the company claimed. The company also offers special programs to improve sales and management, such as an employee commission and evaluation system, customer follow-up systems and a financial evaluation package.

The service station turnkey package is priced from $10,000 to $12,000, depending on local support required, from Marcoin Business Management Services, 1924 Cliff Valley Way, Atlanta, Ga. 30329.

Monitor/Printer Watches Power Outs

COPIAGUE, N.Y. — A power line monitor/printer designed for 120 Vac, 60 Hz power lines that feed microprocessors, dynamic random-access memories (RAM), Winchester disks and similar equipment has been developed by TII Electronics, Inc.

The Glitch Powerline Monitor with Printer (GPM-P) is said to operate unattended and to retain information indicating power line pollution. The unit records faults by date and time for power failure, power line low voltage and voltage spike.

An audible/visible alarm is included for on-line indication of faults. The GPM-P costs $975 from 1375 Akron St., Copiague, N.Y. 11726.

Micro Has 64K RAM

MOUNTAIN VIEW, Calif. — A Zilog, Inc. Z80A/B-based single-board microcomputer with 64K bytes of random-access memory has been introduced by Davidge Corp.

The DSB-4/6 offers a choice of 4 MHz or 6 MHz processor, disk controller, choice of two or four RS-232 ports and a parallel printer port. The unit also features a hard disk port, system software and 2K bytes of erasable programmable read-only memory for start-up, according to the vendor.

The board costs between $695 and $995, depending on CPU and number of I/O ports. The vendor is located at Suite X, 1951 Colony St., Mountain View, Calif. 94043.

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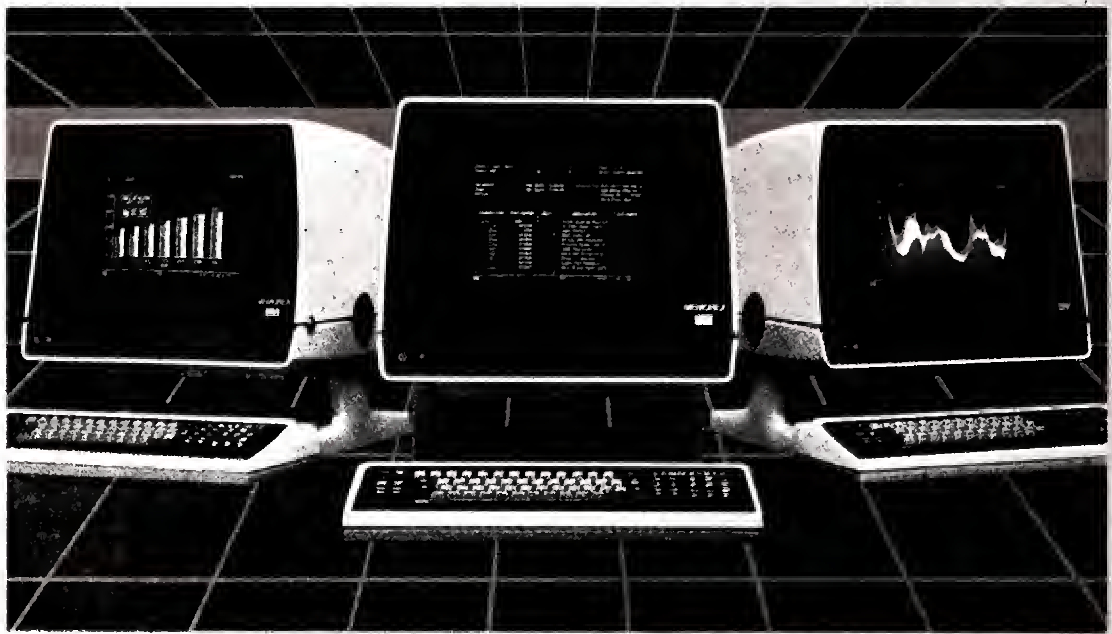

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Hard Disk Subsystems

Apple II Users Get 'Datafile'

PHOENIX — Thought Works, Inc. has announced the availability of its Datafile series of hard disk subsystems designed to operate as mass storage media for the Apple Computer, Inc. Apple II microcomputer.

The 5M-, 10M- and 20M-byte subsystems are self-contained and come complete with intelligent controller, power supply, cabinet and software to support Apple's Ados and Digital Research, Inc.'s CP/M operating systems, as well as a system using Pascal, the vendor claimed.

Datafile can be added to the Apple II using an interface board installed in an available slot of the card cage.

The 5M-, 10M- and 20M-byte Datafiles are priced at $2,995, $3,465 and $3,950, respectively, from Thought Works, 3532 W. Thomas Road, Phoenix, Ariz. 85019.

Interface Out For Apple II, III

BALA CYNWYD, Pa. — Interactive Structures, Inc. has announced Pkaso, an interface that allows users of Apple Computer, Inc. Apple II or Apple III systems to install intelligent text and graphics capabilities.

The interface allows Apple III users to use most matrix printers. Features of the interface include a full snapshot dump of any screen image, a 16-level gray printing scale and both high- and low-resolution graphics. All popular Apple II languages, including Basic, Pascal and Digital Research, Inc.'s CP/M are supported by the interface. When used with an Apple III, full printing and graphics capabilities in either the native mode or Apple II emulation mode are supported, the vendor said.

The Pkaso interface costs $165, the vendor said from 112 Bala Ave., Bala Cynwyd, Pa. 19004.

Spinwriter Gets Fifteen Fonts

LEXINGTON, Mass. — NEC Information Systems, Inc. has announced 15 new font styles for its Spinwriter letter-quality character printers. All of the new fonts offer extensive foreign-language printing capabilities, according to NEC.

The new offerings include Letter Gothic Multilingual A, Prestige Elite Europe A, Prestige Elite Europe B, Elite 12 Norwegian, Elite 12 French, Elite 12 Swedish, Courier 72 British, Courier 72 French, Courier 72 German, Courier 72 Norwegian, Courier 72 Swedish, Prestige Elite 12 British, Prestige Elite 12 German, Prestige Elite 12 Norwegian and Prestige Elite 12 French.

The fonts are offered on NEC's "thimble" print element, which can utilize up to 128 different characters on a single element. The thimbles are durable, low-mass print elements with an average service life of more than 30M char., the company reported.

The thimbles are offered for all models of NEC Spinwriter printers including the 7700 series of 55 char./sec printers, 3500 series of 35 char./sec printers and 2000R 20 char./sec printers. Each thimble costs $22 from NEC at 5 Militia Drive, Lexington, Mass. 02173.

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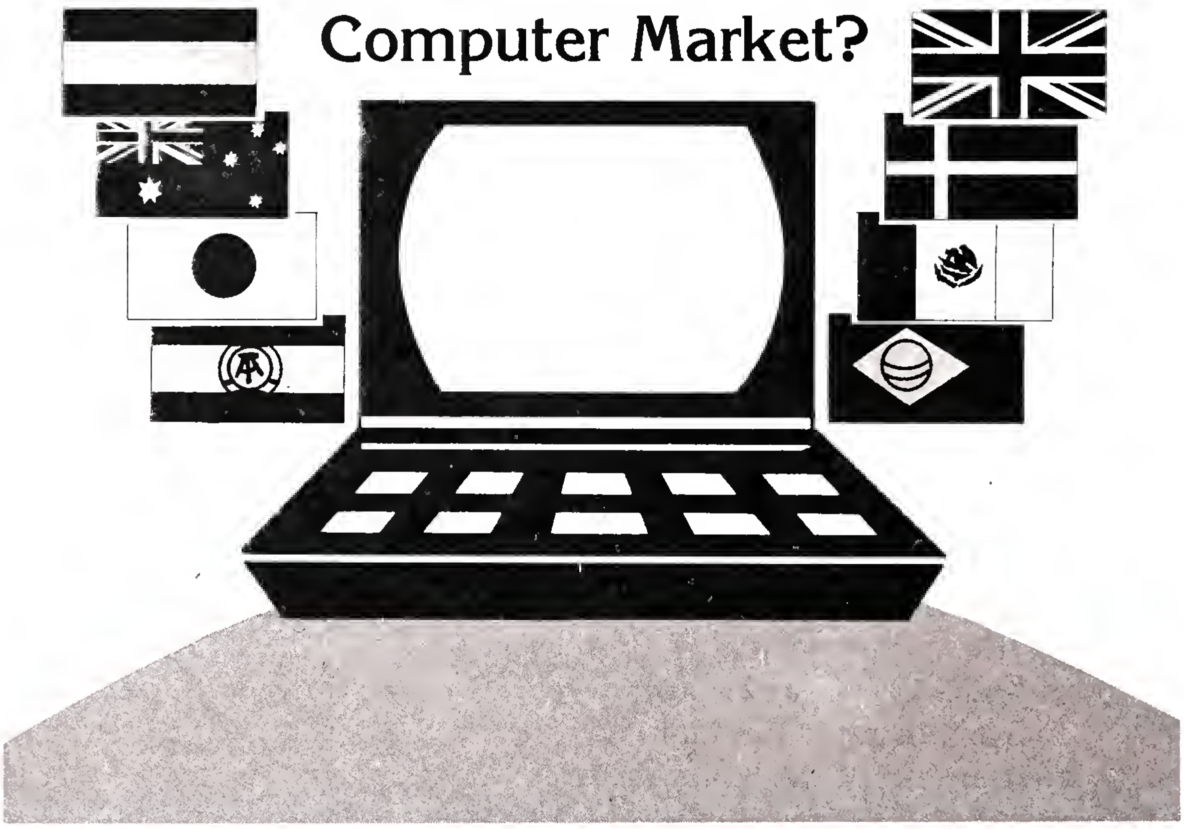

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CCX Introduces Two Services For Electronic Mail

CONWAY, Ark. — Conway Communication Exchange (CCX) has introduced a family of on-line electronic mail products. The products are managed through client-based terminals which are electronically linked to the company's central processing facility here.

Among the services said to be offered are the company's CCX-Gram, computer letter services, a personalized computer letter, the U.S. Postal Service's Electronic Computer-Originated Mail (Ecom) and Western Union, Inc.'s Mailgram.

For current clients of the network, the process is simply a matter of entering both the message and list rental order onto their terminals. The two are then electronically merged and the specific mailing vehicle is produced, according to the vendor.

Using this on-line system, it is possible to complete a mailing in two days, a vendor spokesman said. Those not in the CCX network could use the electronic mail products. They can either work through a network member who has a terminal or they can ship the names and addresses along with their messages to CCX's office.

The charge for the service is 26 cents per one-page message, 31 cents per two-page message and a nominal fee for additional pages. More information is available from CCX, 301 Industrial Blvd., Conway, Ark. 72032.

Electronic Mail Out for B1900

EASTLAKE, Ohio — Consolidated Data Processing, Inc. has introduced store-and-forward electronic mail software for the Burroughs Corp. B1900 mainframe.

The Arrow electronic mail system features report distribution capability at remote locations, message routing as well as message distribution and on-line interactive communications. The report distribution capability integrated with store-and-forward message switching is said to allow any printer backup file or message system built on a CRT terminal to be sent to one or more of the system's users, a vendor spokesman said.

The software is available for $16,000 from Consolidated Data Processing, located at 34300 Lakeland Blvd., Eastlake, Ohio 44094.

Determine Company Needs Before Evaluating Methods Of Electronic Mail, Exec Says

By Jim Bartimo
CW Staff

BOSTON — There are three ways to send electronic mail over long distances: through a provider such as Source Telecomputing Corp., in a point-to-point configuration or through Western Union, Inc.

Gary I. Weiner, vice-president of marketing for Microcom, Inc., a manufacturer of hardware/software communications equipment, made that observation at The OA Forum here recently. "If mail is the process of transporting visual information from an originator to a receiver, then electronic mail is just one method of doing this," he said at the conference sponsored by CW Communications, Inc.

In evaluating which method is best for each individual company, the potential buyer should first determine his company's needs, Weiner said. The potential user should consider with whom he needs to communicate, where these people are located, what equipment they have and how often he will send mail to them.

CW Photo by J. Bartimo

Gary Weiner

Electronic mail providers such as Source Telecomputing Corp., Compuserve, Inc.

(Continued on Page 98)

IBM System/38 Capabilities Now Include OA Applications

RYE, N.Y. — IBM has announced expanded capabilities for its System/38 computer, including application software for the office environment and a correspondence-quality printer.

The application programs covered by the announcement are called IBM System/38 Office/38. They are directed at improving the productivity of professional and administrative office workers.

IBM introduced two new models of its Model 5219 printer, a correspondence-quality, bidirectional, tabletop, printwheel device. The purchase-only printers sell for $5,420 for the 40 char./sec model and $5,835 for the 60 char./sec version.

First shipments for attachment to the System/38 are planned for September 1983. The units will also attach to the System/34 computer, with first shipments planned for April.

IBM System/38 Office/38's Text Management is said to enable users to create, revise, store, retrieve and print letters, memos, forms and other documents. With the program's split-screen capability, users can review information contained in a System/38 data base file while creating or revising a document.

There is a one-time charge of $1,800 or a monthly charge of $50, and the software will be available this October.

The Administrative Management option is a group of programs for managing the personal appointment calendar of individuals or groups, for scheduling facilities such as conference rooms and audio-visual equipment and for logging incoming correspondence and tracking it by author, receiver, data or action status.

Available in May, it has a one-time charge of $1,500.

The IBM System/38 Office/38 Bar Chart program, announced in July, is now available for a one-time charge of $900.

The Applications Made Easy option is a software program that reportedly enables professional and administrative office workers with little or no DP experience to create and maintain simple applications.

It will be available in November for a one-time charge of $4,000.

The company also announced Release 4.1 of the System/38 Control Program Facility (CPF) and Release 1.2 of the System/34 to System/38 Conversion Aid Program. Enhancements to CPF include support for the IBM 5292 color CRT terminal, new support for the IBM 5224 and 5225 printers and functional enhancements.

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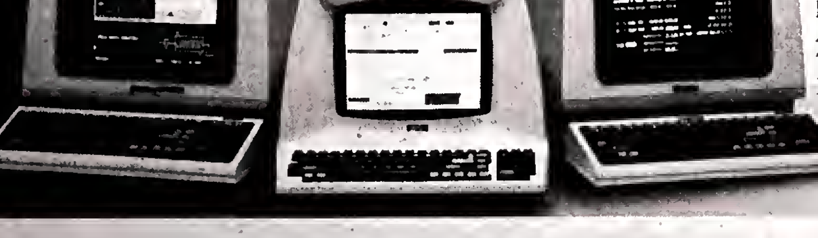

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Exec Compares Three Ways To Send Electronic Mail

(Continued from Page 97)

and others require that the user hook up his personal computer to a modem to communicate with the service. Acting as a clearinghouse or post office, the service stores the message until another subscriber, using his modem and personal computer, logs on and checks his mail, Weiner explained.

The advantages of this method are that the services provide local telephone access through Telenet or Tymnet, Inc. text preparation review and data integrity while data remains in the network, he said.

However, these services require that both the originator and the recipient of the message subscribe to the same network, and this can severely limit the number of people with whom a user can communicate. Another problem is that unlike a store-and-forward system, the recipient must call in for his messages, and this can revolve around travel and meeting schedules, he said.

The last requirement for a provider-based electronic mail system is that "the personal computer must be able to talk Ascii in an electronic mail communication," he said.

Point-to-point electronic mail has its own set of advantages, Weiner explained. In this configuration, a user cuts out the provider as middleman. The originator hooks his personal computer to a modem that directly accesses the receiver's modem and personal computer.

Method Provides Flexibility

This method provides more flexibility in the type of data that can be sent (for example, text data), error checking, immediate delivery, flexibility in the reprocessing of information and mailing list storage, he said.

The point-to-point configuration requires only that both parties in the network use the same software. "For instance, if someone is sending with Easywriter to someone using Wordstar, it just wouldn't work," Weiner pointed out.

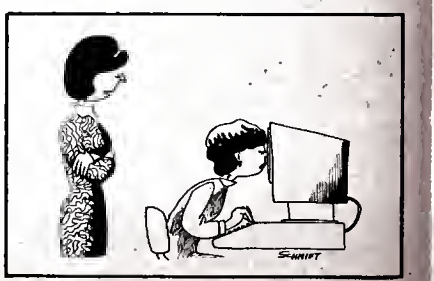
Because you must prepare your data while on-line to a provider, the costs of preparation are greater than with point-to-point, with which you can prepare text on your own time and send when complete, Weiner said. Point-to-point is cheaper in most other areas such as review and storage, but costs more in line fees that are accrued just as if you were talking on the telephone instead of sending text with it.

At 300 bit/sec, point-to-point is the more economical way to send electronic mail, according to Weiner.

A third method involves using Western Union as the middleman between the originator and the receiver. With this method, the personal computer is made to look like a telex or TWX terminal, Weiner said.

The major disadvantage of the Western Union method, Weiner said, is the unavailability of error checking and high transmission speed. However, Western Union has a large base of subscribers with a directory of users, he said.

The potential user must evaluate the advantages and disadvantages of each method, bearing in mind the cost, user friendliness and other factors. The best way to become familiar with all of these factors is to go to a microcomputer retail outlet and try them all, Weiner said.



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STRATUS VS. TANDEM

(Or how the hardware fault tolerant solution supersedes the software based solution.)

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> *You can build a double computer inside one box for less dollars, as opposed to doing it in software, which continually needs maintenance and revision, as well as improvement."*
>
> by Aaron Goldberg
> of IDC which
> appeared in *Computerworld's*
> December 28, 1981 issue.

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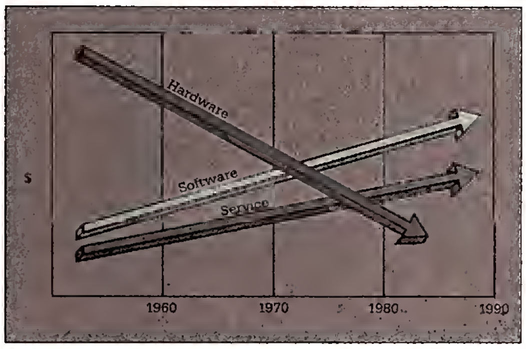

While software costs will rise because they are people dependent, experts agree that hardware costs will continue to fall.

Why Stratus is easier to implement.

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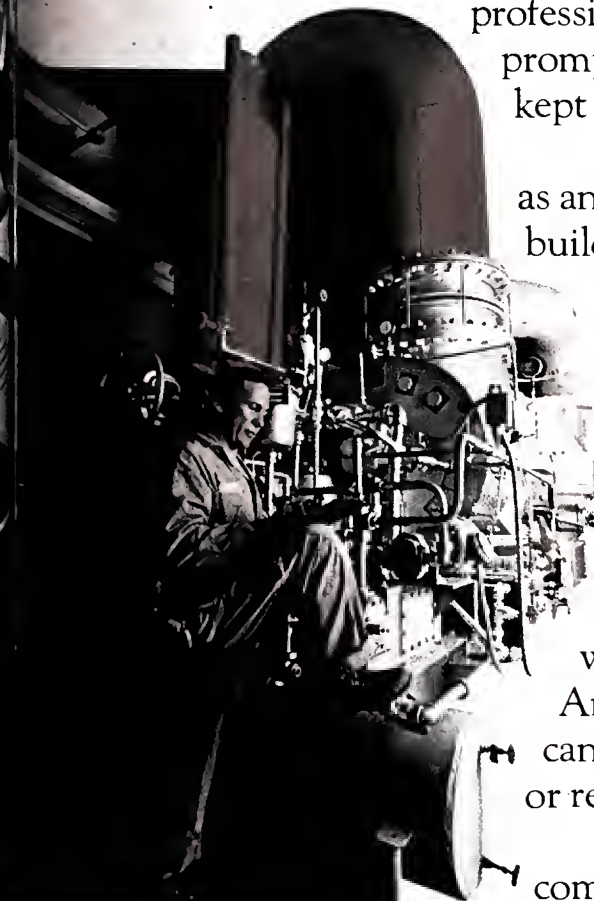

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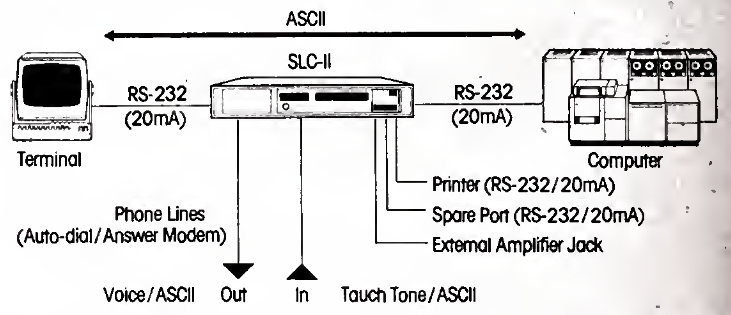

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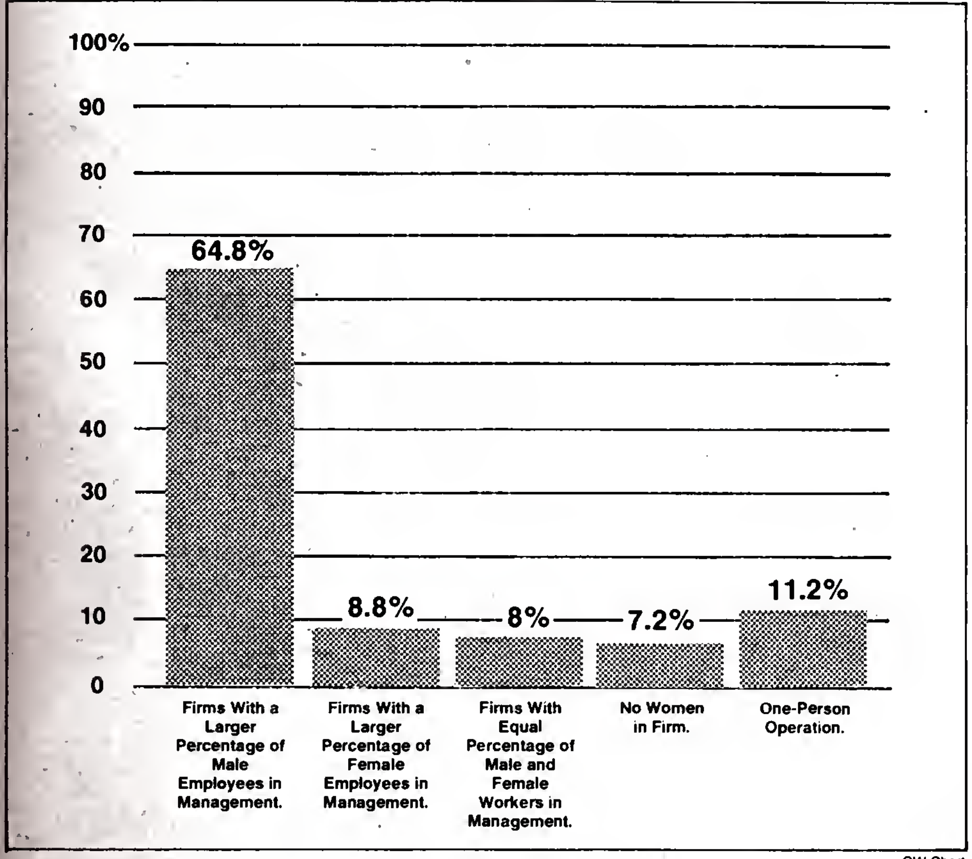
In DP Industry Firms

More Male DP Execs Found Than Female



CW Chart

The Survey Respondents

By Marguerite Zientara
CW Staff

It is no surprise that an overwhelmingly large number of firms in the DP industry employ a greater percentage of males than females in management positions. What may be enlightening are the reasons why.

In a reader survey *Computerworld* mailed to 500 top executives of hardware, software, service bureau and consulting firms of all sizes around the U.S., a number of the 125 respondents indicated they perceived no discrepancy between the number of male-held and female-held management positions in their firms. Actual percentages, however, often told another story.

For example, one consulting firm stated it has 10 employees — four men and six women. Of these employees, one man and one woman are in management. Therefore, while there are equal numbers of each sex in management, one-fourth of the men are in management, compared with only one-sixth of the women.

The survey found that 81 of the 125 respondents (64.8%) had a larger percentage of male employees in management; 11 of the 125 (8.8%) had a larger percentage of female employees in management; 10 respondents (8%) had equal percentages of male and female employees in management; 14 were one-person operations (11.2%); and nine companies (7.2%) employed no women at all.

Among the 81 firms with larger percentages of males in management, 12 indicated that their firms were too small to have many management positions. "Gender is truly not a criterion for promotion within our organization," said Jerry Elbott, president of Minicomputers, Inc. in Tulsa, Okla. "Because we are small, there is only one true management position."

The president of a three-man, one-woman software consulting firm in Maryland stated, "We have only been in existence for 4½ years. However, our [female] bookkeeper is as valuable as any one man in our firm."

(Continued on Page 112)

Her Main Problem? Client Credibility

By Marguerite Zientara
CW Staff

BOSTON — Chris Holland is not happy. As a project manager for a financial software consulting firm in the Boston area, she feels the effects of subtle and overt sex discrimination as she works in a male-dominated field.

Her main problem in her business environment is "credibility with clients," Holland reported. "The financial community is very conservative, and they generally don't like a woman telling them how to do something."

After installing her firm's project, Holland monitors the project's progress. "If there is anything wrong on the project, I go to the client's project head, who is always a man, and his immediate reaction is to be very kind and listen to me, but he wants to see for himself," she said.

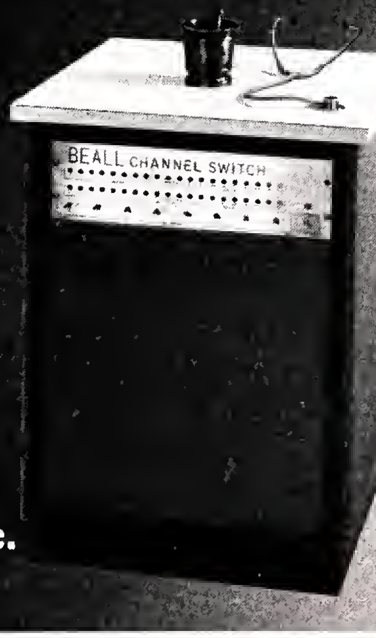
"He's not sure he agrees with me, and he wants to call my boss to discuss alternatives," she added. "The typical comment is, 'I'd prefer to discuss this with so-and-so; he sure has a lot of experience.'

"My male colleagues are surprised this happens, because [the questioning of their experi-

(Continued on Page 112)

CW Photo by M. Zientara

Chris Holland



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M/A-COM Firm to Plan In-House Venture Capital

By Bill Laberis
CW Staff

BURLINGTON, Mass. — How can a $600 million communications leader harmonize the work of a score of operating companies with overall corporate strategies while scrutinizing technology trends that impact growth and internal development?

To the management at M/A-COM, Inc., which went on something of an acquisition spree two years ago, the answer is the recently formed M/A-COM Development Corp. Headed by John G. Puente, corporate executive vice-president, the new entity will have some of the appearance of an in-house venture capital firm "with a lot of pizzazz," Puente said.

In essence, M/A-COM Development represents an attempt to centralize and coordinate the efforts of four existing corporate planning functions of a company whose sales have grown geometrically ($125 million in 1980, $300 million in 1981). M/A-COM is a vertically integrated supplier of communications equipment.

"Our aim is to pull together as a single planning entity," Puente said. "We are not necessarily trying to diversify, but to remain a leader."

According to Richard T. DiBona, company president and chief executive officer, M/A-COM Development will be responsible in part for ventures in which the parent firm already has an investment position. Included in this grouping are companies and programs previously associated with its 22 operating units, such as Local Digital Distribution Co., a partnership with Aetna Life and Casualty [CW, June 23, 1980]; Valtec Corp., a joint fiber-optic and cable venture with Philips Systems, Inc. [CW, June 30, 1980]; and the M/A-COM Research Center, the corporate advance engineering facility.

Additionally, M/A-COM Development will examine new candidates for acquisitions and joint ventures as well as technology exchanges and other business arrangements, shepherded all the while by corporate planning strategies.

State-of-the-Art Trends

Included in the four planning functions under Puente's control is a general technology and research component. State-of-the-art trends in communications technology, information Puente can use to direct the efforts of the venture capital group, will be funneled through this group.

The approximately $30 million M/A-COM has sunk into various ventures in recent years has been internally generated, although Puente said M/A-COM Development will investigate joint venture capital possibilities.

The strategic planning group will keep tabs on the parent's 22 operating units, ensuring their individual goals are aligned with both corporate and venture capital strategies.

Planning Strategies

Meanwhile, the corporate affairs group will scan industrywide trends and developments, reporting on their potential impact on overall planning strategies. An analysis of the recent settlement of the federal government's antitrust suit against AT&T is one example of a trend that directly impacts corporate planning, Puente noted.

"As far as our planning activities go ... the Bell settlement means there will be 22 operating companies free to buy equipment from other vendors, like us," Puente said. "We're already a major Bell system supplier."

Puente will continue as executive vice-president and vice-chairman of M/A-COM's board of directors while serving as president and chief executive officer of the new corporation.

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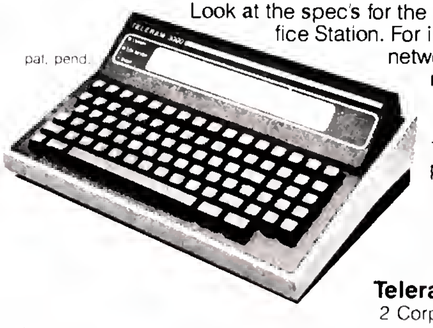

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IBM Offering $50 Million To Universities

ARMONK, N.Y. — IBM is offering a total of $50 million in cash and equipment to help universities to develop manufacturing and engineering courses.

The four-year program takes two forms. About $10 million in cash is available to universities developing masters-level manufacturing or engineering programs. The bulk of that figure will go to five universities for the development of large-scale projects. About 20 other universities will receive smaller cash development grants, IBM said.

To qualify for the grants, interested universities must submit a proposal to IBM by Nov. 1, a spokesman said.

For the second part of the grant program, IBM is offering about $40 million worth of hardware to 20 universities for the development of computer-aided design and manufacturing (CAD/CAM) systems. The CAD/CAM systems can be used for either graduate or undergraduate studies and are available in one of two hardware configurations. Chosen universities will reportedly be able to use a CAD/CAM system based around either IBM's 4341 or 3033 CPUs.

Applications for the hardware grants must be submitted by Dec. 31. Selections will be made by next spring. Applications can be sent to IBM, University Relations Department, Old Orchard Road, Armonk, N.Y. 10504.

Report Predicts Bleak Economic Future Unless U.S. Invests in Technology, R&D

By Robert Batt
CW West Coast Bureau

SACRAMENTO, Calif. — Unless the U.S. invests in new technologies, research and development and education, the nation will be faced with continued declines in productivity, slow growth and high unemployment for years to come.

That is the somber message that emerged from a 55-page report titled "Winning Technologies: A New Industrial Strategy for California and the Nation," released by the California Commission on Industrial Innovation. Chaired by California Gov. Jerry Brown and including David Packard, chairman of Hewlett-Packard Co., and Charles Sporck, president of National Semiconductor Corp., the commission called for a strategy to accelerate the invention and utilization of what it calls "winning technologies."

Among its recommendations, the commission proposed that:

- The U.S. should establish antitrust exemptions for joint research by high-technology companies.
- Universities should raise entrance requirements in computer studies.
- California should promote the development of computer software to expand computer education for interactive learning.

"The challenge of foreign competition and domestic industrial obsolescence requires that our genius for technological innovation become the guiding concept of the next decade," Brown wrote in the report's introductory remarks.

The commissioners stressed that the U.S. must retain its international lead in industries such as computers, semiconductors, telecommunications and robotics. These industries must not be allowed to succumb to targeted competition from foreign governments marshaling their national resources against segments of American industry.

"One critical element to realizing such a goal is the creation of a new governing coalition between business, labor, academia and government. We can ill afford continued confrontation between these sectors," the report said.

The commissioners argued that recent economic developments indicate the U.S. is suffering from structural problems in its economy. A national strategy designed to encourage the spread of winning technologies — for example, product, process and service innovations — is required throughout our industrial structure, they argued.

"The success of such a strategy depends on the restructuring of government policy so as to ensure that our tax, research and development, trade, education and job-training policies are in fact promoting innovation and modernization," the report added.

According to Sporck, without such a strategy, the U.S. will look like a Third World country in the 1990s. "The winning technologies that promote innovation, productivity and lower inflation need to become the focus of a state and federal industrial policy," he added.

Among the recommendations made by the report are:

- The President should elevate high-technology products to the highest possible priority in the ongoing General Agreement for Tariffs and Trade negotiations.
- California should reorient existing math and science achievement tests to stress problem solving and not rote computation. The advent of the computer age, the report said, means problem solving will become more important with computers providing access to information that was previously memorized by students.
- Private industry should provide employees to train teachers in math, science and computer studies and provide industry sites for hands-on computer training.
- California should encourage school districts to form regional high-tech high schools that pool trained teachers, equipment and curricula.

The commission also recommended that the U.S. encourage investment in growth technologies that are the subject of major overseas competition. But the commissioners could not agree on the role the U.S. government should play in providing direct assistance to such industries.

IBM, TI Ink Pact to Develop Chips for Local-Area Nets

WHITE PLAINS, N.Y. — IBM and Texas Instruments, Inc. have made a joint development agreement for very large-scale integration (VLSI) chips. The chips will allow the attachment of computers, terminals, and other information processing devices to a local-area network.

The joint effort will involve the development of a configuration of chips that are mountable on a printed-circuit card.

TI will design the chips according to IBM's functional specifications. The development program will be managed by IBM's Communications Products Division and TI's Semiconductor Group, a spokeman for the companies said.

TI's approach will combine its high-density and high-performance semiconductor VLSI design technique with IBM's systems design approach to high-performance token-passing local-area networks, according to William N. Sick, executive vice-president and manager of TI's Semiconductor Group.

New Companies

Mnemos, Inc., a subsidiary of Combined Technology Corp., has been formed to develop new information storage systems. The firm plans to announce in the near future a process using electron-beam technology to improve upon optical and video disk systems while offering the advantages of both.

Access Telecommunications Corp. is a firm formed by the codevelopers of the Access product line for the IBM System/34 and System/38 to provide improved coordination of marketing, installation support and new product development. Corporate offices are at 60 Shore Drive, Burr Ridge, Ill. 60521.

Advanced Design and Designing Techniques, Inc. offers programming development and continued service support including a priority calling system guaranteeing 24-hour response to software problems. The firm is located at 649 Mission at New Montgomery, San Francisco, Calif. 94105.

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In Copyright Suit

Judge Awards $250,000 to Software Developers

By Paul Gillin
CW Staff

SAN RAFAEL, Calif. — Another page in the continuing battle of software developers against product piracy was written late last month when a federal judge awarded $250,000 and reimbursement of legal expenses to two software companies that sued for copyright infringement.

The judgment, based on an out-of-court settlement among the parties, is believed to be the first in a copyright infringement suit based on unauthorized copying of microcomputer applications software.

Judge William W. Schwarzer entered the stipulated final judgment in Federal District Court in San Francisco against Data Equipment and its chairman, Daniel M. O'Rourke of Mountain View, Calif. The suit was brought by Micropro International Corp. and Digital Research, Inc.

The companies alleged that Data Equipment had illegally copied Micropro applications including Wordstar, Datastar, Mailmerge and Wordmaster and CP/M software from Digital Research.

Rick Giardina, Micropro counsel, said the judgment is significant because the pirated material was copied from machine-readable object code. The "copyrightableness" of machine-readable software has been the subject of an ongoing legal debate since software was first granted copyright protection under the Computer Software Copyright Act of 1980.

Micropro learned of the piracy only after an end user returned a bootlegged program to Micropro for updating. Serial number checks found that the program was not a Micropro product. Data Equipment had been a licensed dealer for Micropro software, which it sold with its packaged systems. The contract, however, did not allow Data Equipment to duplicate any programs.

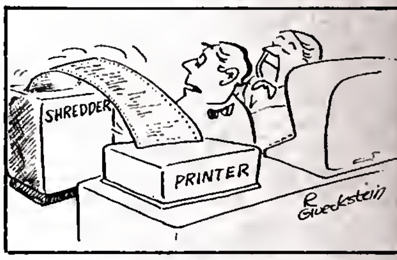
Giardana estimated that because of piracy Micropro is paid for only about one out of every five of its applications packages in use. "We discover, however, that most end users aren't even aware that it's illegal to copy these programs," he said.

The judgment does not carry the precedent-setting status of a legal decision, and some analysts say it's significance should not be overestimated. "There has been confusion about how far copyright protection extends to software," said Daniel T. Brooks of Computer Law Advisers. "This settlement is simply another step in a series of recent decisions which have helped to clear that confusion."

Susan Nycum, partner in charge of the high-technology group with the law firm of Gaston, Snow & Ely Bartlett, said judgments in favor of plaintiffs in software piracy suits will encourage more developers to take their cases to court. "I see a trend toward companies becoming more aggressive in taking legal proceedings," she said. "There should be a message here to people who are playing fast and loose with other people's software products: that companies are seeking protection of the law and will be given it."

"In my mind the decision will go a long way toward letting software developers feel more confident about copyright protection," said Robin Robinson, president of the Association for Software Protection and vice-president and legal director for Micro Business Software, Inc. "The pirates are aware that laws are shaky and they challenge them. The more frequently settlements are made in favor of the developer, the less likely pirates are to say, 'Go ahead and try to stop us.' "

Seymour Rubinstein, president of Micropro, said the settlement "should be taken as a sign that software manufacturers will act aggressively to protect their own products against all unauthorized duplication."



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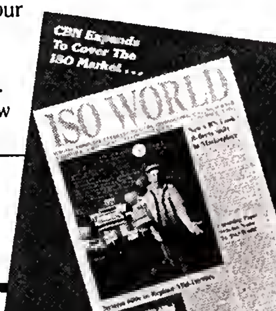

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Burroughs Forms Group

DETROIT — Burroughs Corp. has consolidated its Office Products Group within a new corporate entity. The new group, the Business Information Systems unit, combines both office automation products and an array of small business systems.

The group is responsible for the development of product and marketing strategies for all current and future products related to workstations, office systems and small business systems up through the B20 class.

The Business Informations System unit falls under Burroughs' Industry Systems Group. Named vice-president of the new unit was Ben L. Rouse.

Contracts & Pacts

Advanced Systems, Inc. and Interactive Training Systems have entered into an exclusive, long-term agreement to develop and market interactive, computer-based learning systems that teach technical and managerial skills to data processing professionals. The two firms expect extensive product availability by mid-1983.

Bolt, Beranek and Newman, Inc. has been awarded a five-year, $3.2 million contract by the National Institutes of Health (NIH) to establish and maintain a national data bank of DNA sequences and related genetic information. Principle funding is from the National Institute of General Medical Sciences of the NIH with cosponsorship from the National Cancer Institute, National Institute of Allergy and Infectious Diseases, Division of Research Resources, the National Science Foundation, the department of Energy and the Department of Defense.

RCA Merges OA Operations

CHERRY HILL, N.J. — RCA Service Co. has merged the marketing and sales activities of its Telephone Systems and Data Services operations "to further enhance its position in the emerging high-technology 'office-of-the-future' market," a company spokesman said.

The firm plans a direct entry into office automation in 1983, when it begins to market a digital private branch exchange.

The digital switch can reportedly switch voice or data conversations with equal effectiveness.

Orders & Installations

Mellon Bank of Pittsburgh, Pa., has installed American Management Systems, Inc.'s computer-assisted collection system.

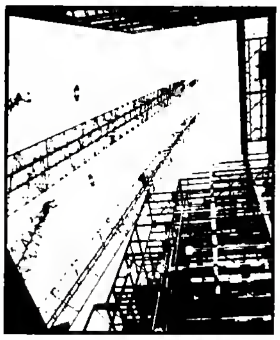
Sperry Univac has received a $6.1 million order from Computer Alternatives, Inc. (CAI) for a Model 1100/82 system to be installed at CAI's disaster recovery facility in Elmwood Park, N.J.

Computer Sciences Corp. has received a three-year contract valued at more than $36 million from the Environmental Protection Agency for computer-related services, including software development and data base design. The firm will provide data processing, technical and operational support to the agency's Washington, D.C.; headquarters and 10 regional offices and to eight of its research laboratories.

Data Terminal Systems, Inc. has received a $1.75 million equipment order from the Alcoholic Beverage Control Board of the state of Arizona. The order includes 200 DTS Model 515 point-of-sale terminals as well as slot scanners, wand scanners and other support systems.

Collier County, Fla., and Saratoga County, N.Y., have each purchased American Management Systems, Inc.'s Local Government Financial System.

Codex Corp. will provide American President Lines with 6000 series intelligent network processors, a DNCS 400 central-site network control and management system, CS series network-control modems and MX 2400 modems under the terms of a recently signed $1.8 million contract with the firm.



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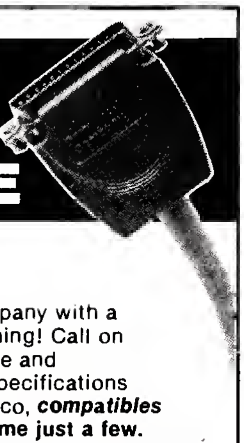

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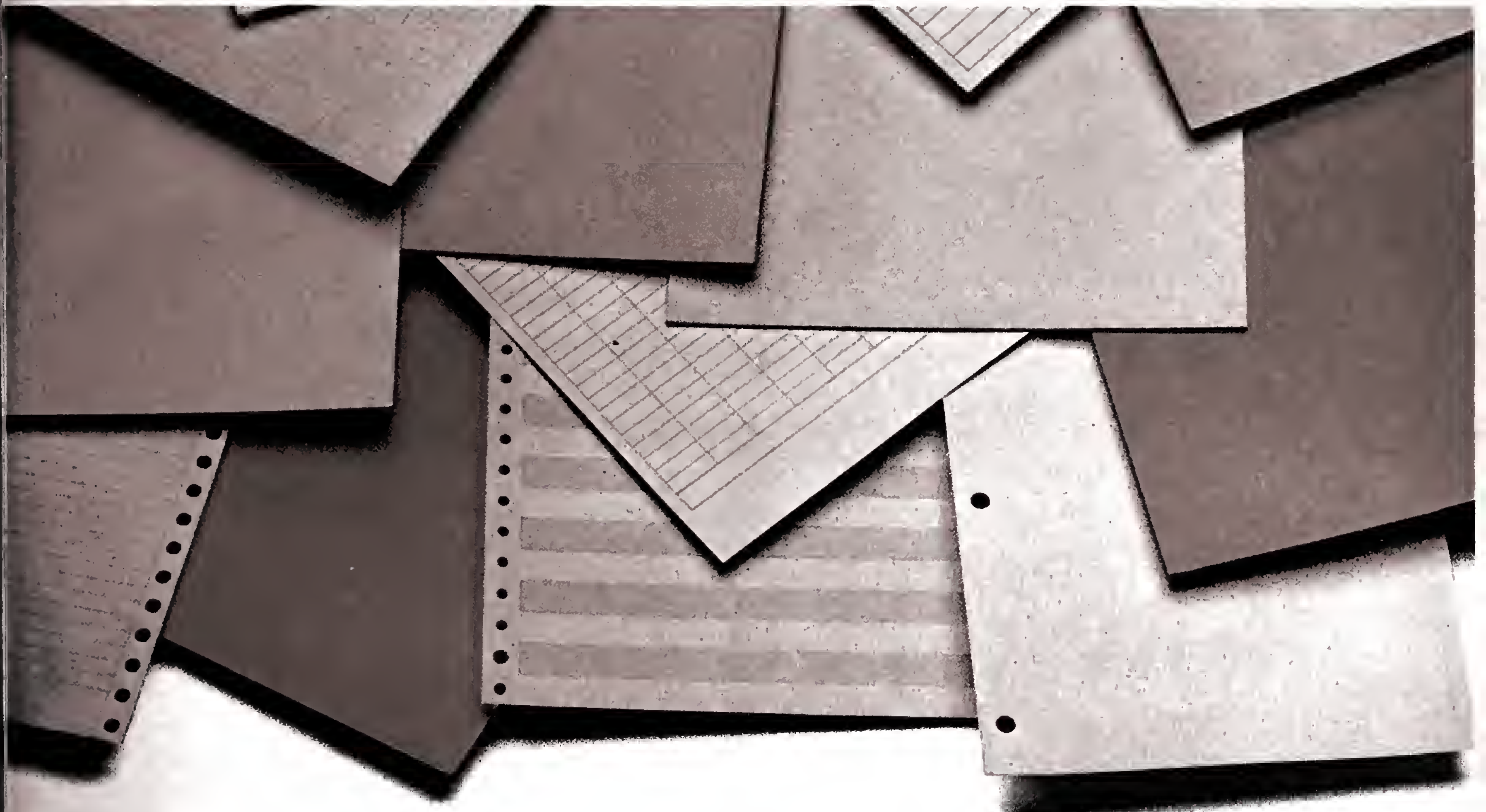

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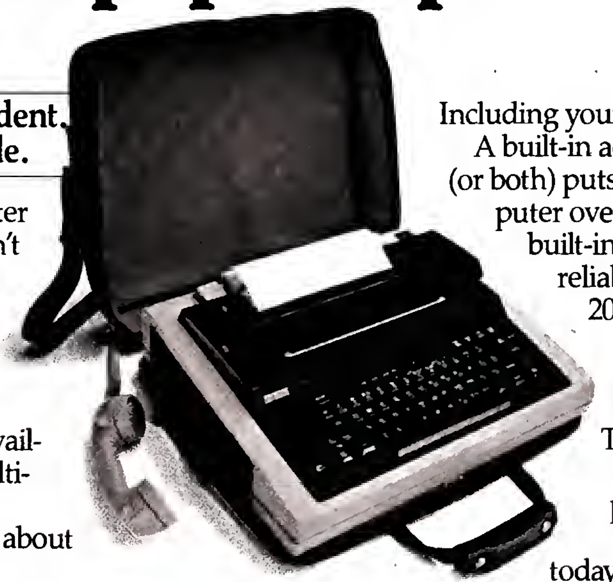

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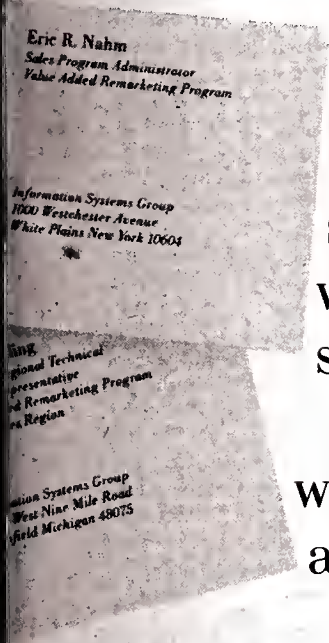

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Survey Finds Reasons Why More Males in Management

(Continued from Page 103)

Seven executives in male-dominated management environments cited experience and capabilities or the lack of qualified applicants as the explanation for fewer women in management. "This is a new company and only men applied for the management positions," one said.

'Coincidence' Cited

Eleven respondents stated that the company founders "happened to be" male and no new managers had been hired since the company began. Bob Klar, president of CPI, Inc., a New York-based firm with six male employees (two management) and one (nonmanagement) female employee, traced the discrepancy in his firm to "coincidence."

An anonymous respondent wrote, "No discrimination here. We just happen to have men more educated and interested in this field. We are in data communications." The respondent added, "I am a woman."

Hugh Bursi, president of The Solutions Group, Inc. in Atlanta, explained, "Three male managers are company founders. The first 'new' manager was a woman and I expect the next manager to also be a woman [currently being 'groomed' for position]."

Another anonymous respondent explained, "The men have been with the firm longer than most of the women, therefore they have had a greater opportunity for promotion."

An administrative assistant in a banking-related DP firm based in Lafayette, La., wrote, "Management and professional positions are filled, both by recruiting outside the company and by promotion from within, without regard to the sex of the individual.

"The difference has occurred because up to the present it has been easier to find male personnel with both the professional qualifications and the management experience that we require," she explained.

On the other hand, Priority Data Systems, Inc. of Omaha, Neb., a firm with 39 employees, has four women in management positions and no men. "I feel we have more female management people because I [the president and owner] am female," explained Marcie Haas. "I am hoping that as we continue to grow, we can hire more management-quality males."

Quality Software, Inc. of Sussex, N.J., has six employees. The only woman employee is in a management position, as are two of the men, giving a higher percentage of females in management (100% vs. 40%). Responding to the discrepancy in actual numbers of male and female managers, firm President Harold Haraldson cited "total staff size and immediate requirements, also travel requirements for handling projects" as the reasons.

Travel requirements were also mentioned by the head of a firm that has no female employees. David Chopp, president of Manufacturing Solutions & Systems, Inc. of Brookfield, Wis., explained, "Our work requires substantial travel. We have not been able to find qualified women who will accept this amount of travel."

Another firm with a higher percentage of females in management is Data Resource Corp. of Atlanta. "We have four management positions — three held by women," according to President Becky Finley. "It is a female-owned business. We do not discriminate toward either men or women — all are given equal opportunity."

M.A. Ferguson of Columbia EDP Center, Inc. in Columbia, Mo., responded: "In general, women have not expressed interest in pursuit of management positions." Ferguson, the head of a service bureau with a slightly higher percentage of men in management than women added, "Supervisory and management positions are developed from within, so employees must be 'dedicated.' "

With both of its women and its one male employee in management, Hearne Interactive Systems, Inc. of Fairlawn, Ohio, believes in equality. "We are a professional, DP-services-only organization," explained President O. Kirt Hearne. "We believe the time has come for DP professionals to organize and conduct themselves as other professionals such as accountants, lawyers, doctors, etc. In this environment, I feel that women perform equally with men."

How Long for Women to Climb?

Of the 125 executives who responded to *Computerworld*'s mail survey on management, only one indicated it takes women less time than men to reach management positions in his firm.

Joseph P. Ternavan, president of B.I.P., Inc. in Bloomingdale, Ill. — a banking DP center that employs 20 women and 10 men — estimated that women can reach management in two years, as opposed to a man's estimated four-year career path.

"In our particular company, more jobs are typically filled by women — jobs like proof operator, clerical control operator and computer operator," Ternavan explained. "For supervisory positions, we promote from within, so people have joined us and in a reasonably short period of time have reached management."

Fifty respondents indicated it took the same amount of time for men and women to reach management; 46 respondents did not answer the question; 14 respondents were one-person operations; and 9 respondents employed no women.

When asked whether sex discrimination complaints, formal or informal, had been filed against the firm, 113 said "never," seven said "rarely," three said "sometimes" and two did not answer the question.

Credibility Her Main Problem

(Continued from Page 103)

ence] never happens to them," she said. "One of the most critical things any organization should do is stand behind their women when they're out there [in the field].

"When the project head calls, my boss should say, 'She's the project manager, I stand behind her,' to discourage the activity," Holland remarked. "Instead, he'll say, 'Yes, I think what she's doing is appropriate; thanks for running that by me.' He says he can't deny his clients access to him."

Root of Problem

One of the roots of the problem is that "the entire marketing phase of the operation is staffed by men so that the initial contacts are with men," Holland explained. "If we had women in marketing it might not be a problem, but we don't.

"After the novelty of working with a female project manager wears off, there is a mistrust and hesitancy to let me do my job without someone back in the office giving his stamp of approval," she added.

It is only in the field and in dealing with her own firm's upper management that Holland feels any discrimination, noting, "I get a lot of support from my peers."

Does the alleged discrimination affect the quality of Holland's work? "It certainly affects my emotional level in running a project," she said. "I work best when the people around me are aware of my capabilities and have confidence in me. Now a lot of frustrations come into the picture and my efficiency comes down."

While a number of survey respondents (see story on Page 103) indicated they have trouble finding women willing to travel as much as management-position jobs demand, Holland noted she spends 60% of her time on the road.

Even though she is willing to travel extensively, Holland estimated she makes "$5,000 to $6,000 less than the men in my field." She blamed that on the fact that she started at a lower pay scale, in payroll accounting.

"A 20% raise on nothing is nothing," she noted. "I've spent the last two to three years playing catch-up."

More overtly, Holland recalled a situation when she was introduced to a client's vice-president: "The best part about Chris is her blue eyes."

On another occasion, "I asked a question in a meeting, and the person I asked directed his answer to my boss, not me," Holland said. Her reaction? "I said, 'I'm over here.' "

Is there a solution to these problems? Holland thinks so, but it will take "progressive thinking, understanding and time."

The good news at her firm is that current restructuring of its management team will mean more women in middle-management positions. "I'm just beginning to see signs that they're addressing the concerns of women," she said.

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Women in Management

Study Tracks Sex Bias on Corporate Ladder

By Marguerite Zientara
CW Staff

WELLESLEY, Mass. — A recent study of women in management found unforeseen barriers to their corporate advancement and unexpected similarities in the career frustrations of both male and female managers.

While the study surveyed managers in retail — an industry traditionally favorable to women — the researchers concluded that the barriers discovered "are highly generalizable to other companies and industries."

Moving Up: Women in Managerial Careers found that sex bias, both subtle and overt, does not diminish with larger numbers of women in management. In addition, the report suggested that male managers tend to promote to middle management those women who would be least likely to reach top management and that male executives fail to give female executives honest feedback about their job performance.

Carol Weiss and Anne Harlan of Wellesley College's Center for Research on Women conducted the three-year, $260,000 study financed by grants from 15 corporations and two foundations. The pair studied 96 managers — 48 men and 48 women — from two large regional retail corporations headquartered in the Northeast.

More Women, More Bias

"One of the most startling results of this study is that sex bias is not lower in organizations with high proportions of women in management," the report noted.

"Our prediction had been that organizations with a greater proportion of women managers would have less sex bias due to increased role models, mentors, access to career help and information and greater opportunity for men to become accustomed to working with women professionals," the study continued.

Instead, the researchers found that the anonymous "Company 19," in which 19% of management is female, had a higher incidence of reported sex bias than "Company 6," in which only 6% of management is female.

Weiss and Harlan traced the higher incidence to "increased ambiguity and uncertainty about promotion opportunity for many male managers." They noted, "Under such conditions, stereotypes and sexist behavior could remain high or even increase as a means of coping with the frustration and fear."

The study also uncovered a subtle, unforeseen form of sex discrimination involving promotional patterns. "Middle-management supervisors gave the highest ratings to older, less aggressive women," Harlan said. "These were women who didn't rock the boat, who were less threatening, less dynamic.

"But at the same time," she added, "senior management was looking for different kinds of persons to fill high-level spots. They wanted young, aggressive dynamos. And the women who might have fit that pattern weren't being promoted [by middle management]."

Another major finding of the study was "the striking degree of similarity between men and women managers holding similar positions, both in terms of individual characteristics and organizational experiences."

Their similar characteristics include "high power and achievement needs, high self-esteem and high motivation to manage," according to the study.

Career-Limiting Dilemmas

In addition, similar career-limiting dilemmas were found to be shared by men and women, including unfocused career plans, lack of initiative in seeking training, lack of knowledge about how to get job opportunity information and lack of mentors, according to the study.

For both men and women, age was found to be related to decreases in promotability. "For women, the problem of age is especially difficult, as older age is a predictor of higher performance ratings but lower promotability," the study found. "Older women are seen by their supervisors as highly competent, but the women may get stuck because senior management relate youth to high promotability."

For men, however, favorable promotability ratings and supervisory evaluations are clearly associated with younger managers, the study found. "It seems unlikely that, as women age, their performance sharpens, while for men the opposite occurs," the report noted. "Therefore, we believe performance ratings may reflect a bias against older men in particular."

In the course of the three-year study, subjects were given psychological tests to measure their ambition, motivation and self-esteem and were questioned in confidential interviews of four to six hours. Subjects were questioned about their job histories, their assessments of advancement barriers and their professional aspirations.

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Executive Corner

- Thomas E. Winter has resigned from the board of Burroughs Corp. and will leave his post as executive vice-president of finance and administration at the end of the year.
- Roger V.S. Camp has been appointed president and chief executive officer and Tom Coccione has been appointed vice-president and general manager of Applied Computer Sciences, Inc.
- Richard D. Skinner has been elected president and David S. Cochran has been named a vice-president of Integrated Circuit Engineering Corp.
- Irwin Mark Jacobs has been named group president of integrated digital communications at M/A-COM, Inc.
- George Haddix has been elected president and chief executive officer of Applied Communications, Inc. Michael V. May has been named chairman of the board.
- Darrell Allomong has been named director and chief executive officer of Insurance Data Systems, a subsidiary of Amev Holdings, Inc.
- Robert M. Loonin has been elected chairman of the board of Computer Communications Corp.
- William W. Bentley has been elected vice-president of North American field engineering; Anthony C. Micoletti, vice-president of field engineering support; and Frederick P. Cochrane, vice-president of engineering services for Data General Corp.
- Wilbur L. Riner has been appointed executive vice-president; Akira Kozakai, vice-president of finance; and Tomoyuki Ogawa, vice-president of administration at OKI Electronics of America, Inc.
- Timothy Cronin has been appointed senior vice-president of marketing and planning at Software International Corp.
- Ed Mulvaney has been appointed vice-president of petroleum marketing for Star Technologies, Inc.
- Howard Brooks has been named vice-president and general manager of ADP Autonet, a division of Automatic Data Processing, Inc.
- Michael G. McMenamin has been appointed executive vice-president of Value Computing, Inc.
- David M. Lewis has been named to the new post of vice-president of operations at Prentice Corp.
- Sheldon R. Gawiser has been appointed vice-president of operations at Computerworks.
- Daniel A. Molter has been appointed vice-president of finance at Decision Data Computer Corp.
- Steve E. Johnson has been appointed executive vice-president of ABC-Automatic Business Computing.
- Walter M. Schramm has been named vice-president and general manager and Donald L. Schnitter has been appointed vice-president of marketing of Sumicom, Inc., a Sumitomo Corp. subsidiary.
- John G. Callahan has been appointed vice-president of applications product manufacturing for Western Digital Corp.

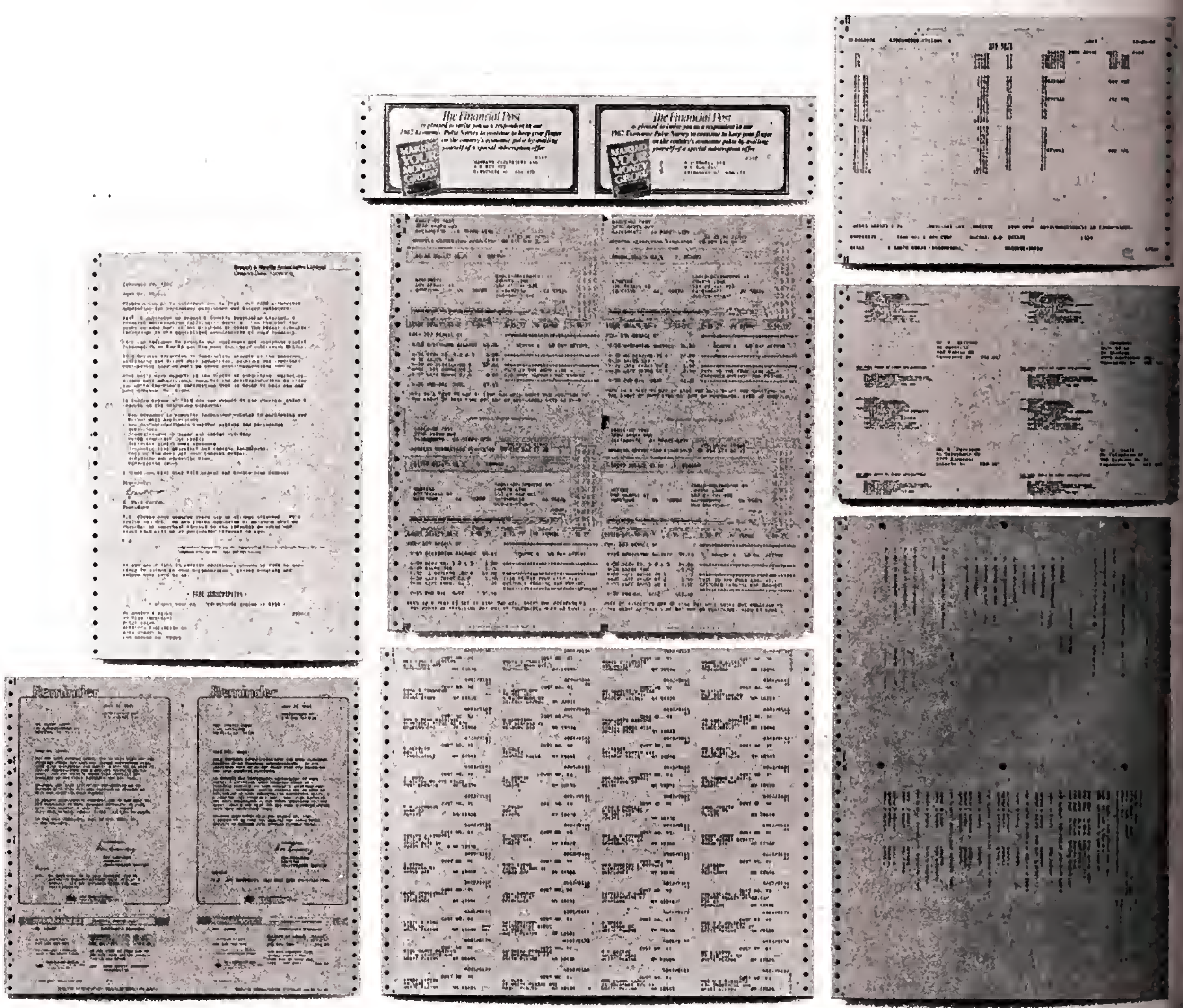
Study Foresees Market Growth In Mini Software

NEW YORK — The U.S. market for minicomputer software will continue its explosive growth through the middle of this decade, according to a study by Frost & Sullivan, Inc.

Titled *The Minicomputer Software Market*, the report predicts that sales will increase from $7 billion in 1981 to $16.6 billion by 1986. Within the market, sales of standard applications packages will rise from $1.2 billion in 1981 to $4.12 billion by 1986, the study predicts.

Sales of system software are projected to expand from $1.5 billion to $4.72 billion, while custom software will advance from $1.1 billion to $2.14 billion and in-house efforts will climb from $3.2 billion to $5.63 billion.

The Minicomputer Software Market study costs $1,250 from Frost & Sullivan, which is headquartered at 106 Fulton St., New York, N.Y. 10038.



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Supershorts

Delta Airlines and United Airlines have announced a joint agreement whereby each will market the other's computerized passenger reservations and accounting systems to the nation's travel agencies, commercial accounts and government agencies. The 20-year joint agreement can be renewed for an additional 10 years.

— — —

Computer & Communications Technology Corp. has combined its two disk drive operations, data peripherals and rotating memory systems into a single unit, Combined Operations Disctron, Inc. Disctron's operations are located in the former rotating memory systems facility in Milpitas, Calif.

— — —

United Computer Corp., a lessor and dealer of new and used IBM equipment, has created a Financal Services Division that will handle direct placement of debt and equity for both leveraged and single-investor transactions.

— — —

Star Technologies and Control Data Corp. have signed a technology license agreement under which Star will develop a high-speed (100 M-flop) array processor using CDC facilities and licensing technologies developed for the Cyber 205 supercomputer. Financial details were not disclosed. Star's ST-100 array processor will be targeted initially to interface with mid-size and mainframe computers and will be in the final prototype stage this winter, according to a company spokesman.

— — —

Xerox Corp. and NCR Corp. have signed a joint technical exchange agreement. Xerox will provide NCR with its 128K-bit read-only memory design technology and will receive NCR's standard cell library in exchange, enhancing Xerox's very large-scale integrated custom capabilities.

— — —

Molecular Design Ltd., of Hayward, Calif., has created a Swiss subsidiary, Molecular Design MDL SG, to manage the company's European operations.

— — —

Harris Corp. has donated two computer processors valued at more than $400,000 to Arizona State University's Engineering Excellence Program.

Mergers & Acquisitions

AGS Computers, Inc. has signed an agreement to acquire **Atlantic Management Systems,** a software firm specializing in systems development and project management products.

Continental Telecom, Inc. has modified its acquisition agreement in principle with **Cado Systems Corp.** The agreement has been modified to allow Cado shareholders the option of receiving either a two-thirds share of Continental's common stock or $10 cash for each common share of Cado stock upon completion of the proposed merger.

Control Data Corp. has completed acquisition of **Tabershaw Associates,** Rockville, Md., a developer of computer-based employee health protection and monitoring systems.

Nickels & Dimes

Micro Peripherals, Inc. has arranged more than $9 million in added financing from venture capital sources. Seidman, Jackson, Fisher head the new investor group, which includes William Blaire Venture Partners. The funds will be used to eliminate all long-term debt and for expanded manufacturing and product development.

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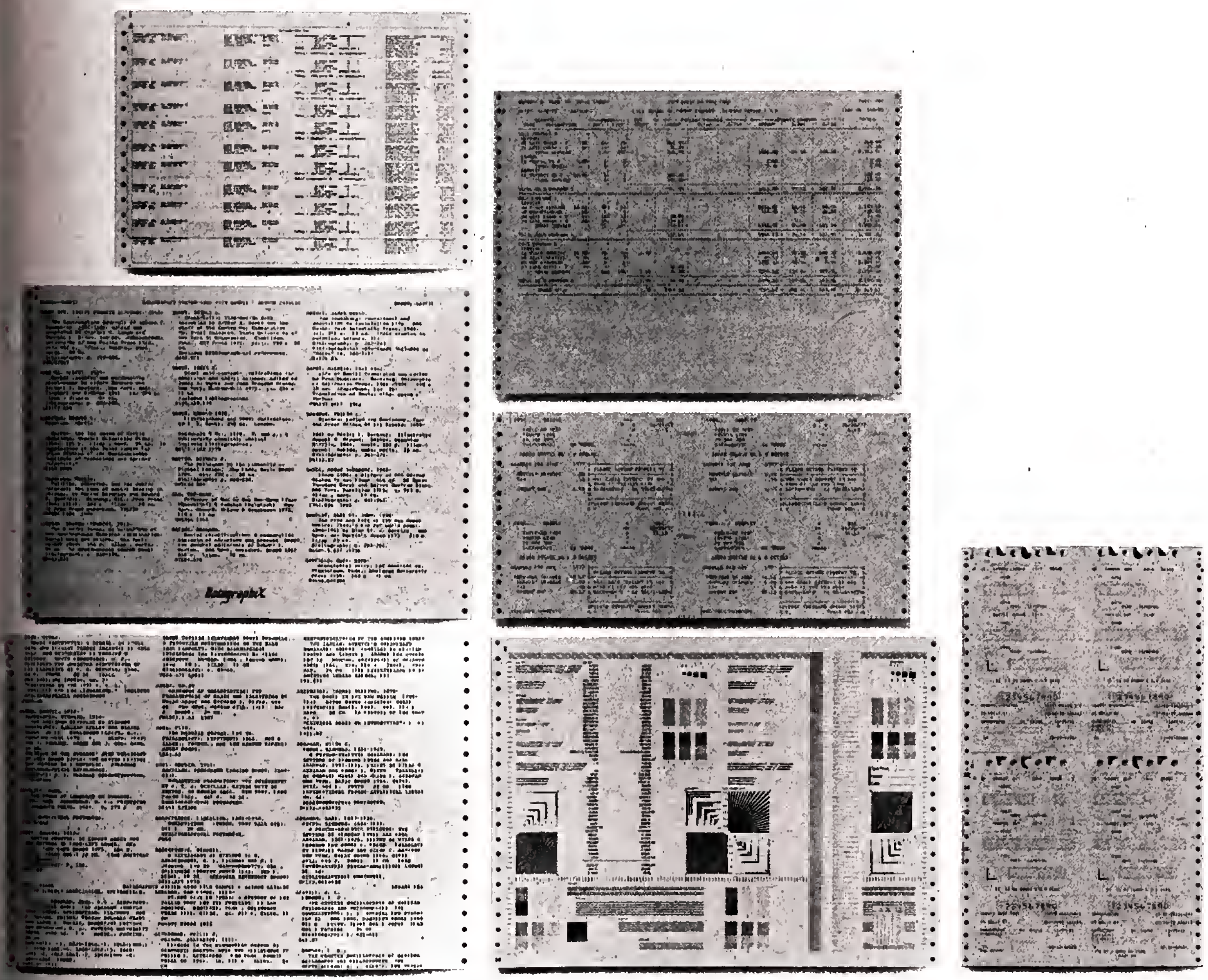
AGS Computers, Inc. is proposing a public offering of $10 million of convertible subordinated debentures, due 2002, in place of the now postponed previously announced offering of 1.5 million shares of common stock.



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Multiuser Systems to Double Share Of Micro Mart in Five Years

MEDFIELD, Mass. — Multiuser systems will double their present 14% share of the total desktop computer business over the next five years, according to a market study prepared by Advanced Resources Development, Inc. here.

Desktop Business Computers: Markets and Strategies: 1981-1985 predicts that single user systems from vendors like Apple Computer, Inc., IBM and Digital Equipment Corp. will continue to dominate the desktop business, but multiuser systems will capture an increasing share due to the demands of users for hard disk storage and multiuser access to files on systems that are priced under $20,000.

Multiuser systems will remain the most cost effective approach for configuring low-end business systems with shared file and peripherals, the report continues.

Medium and large organizations will install multiuser systems to provide low-cost distributed processing for branch offices and small departments, the report says. But the major stimulus to multiuser system growth will be the rapid acceptance by small businesses. A multiuser system will provide a small business with the processing power of a mid-size minicomputer of the '70s for a fraction of the price, the report claims.

Desktop Business Computers: Markets and Strategies: 1981-1986 is priced at $1,695 and is available from Advanced Resources Development, 28A Park St. Station, Medfield, Mass. 02052.

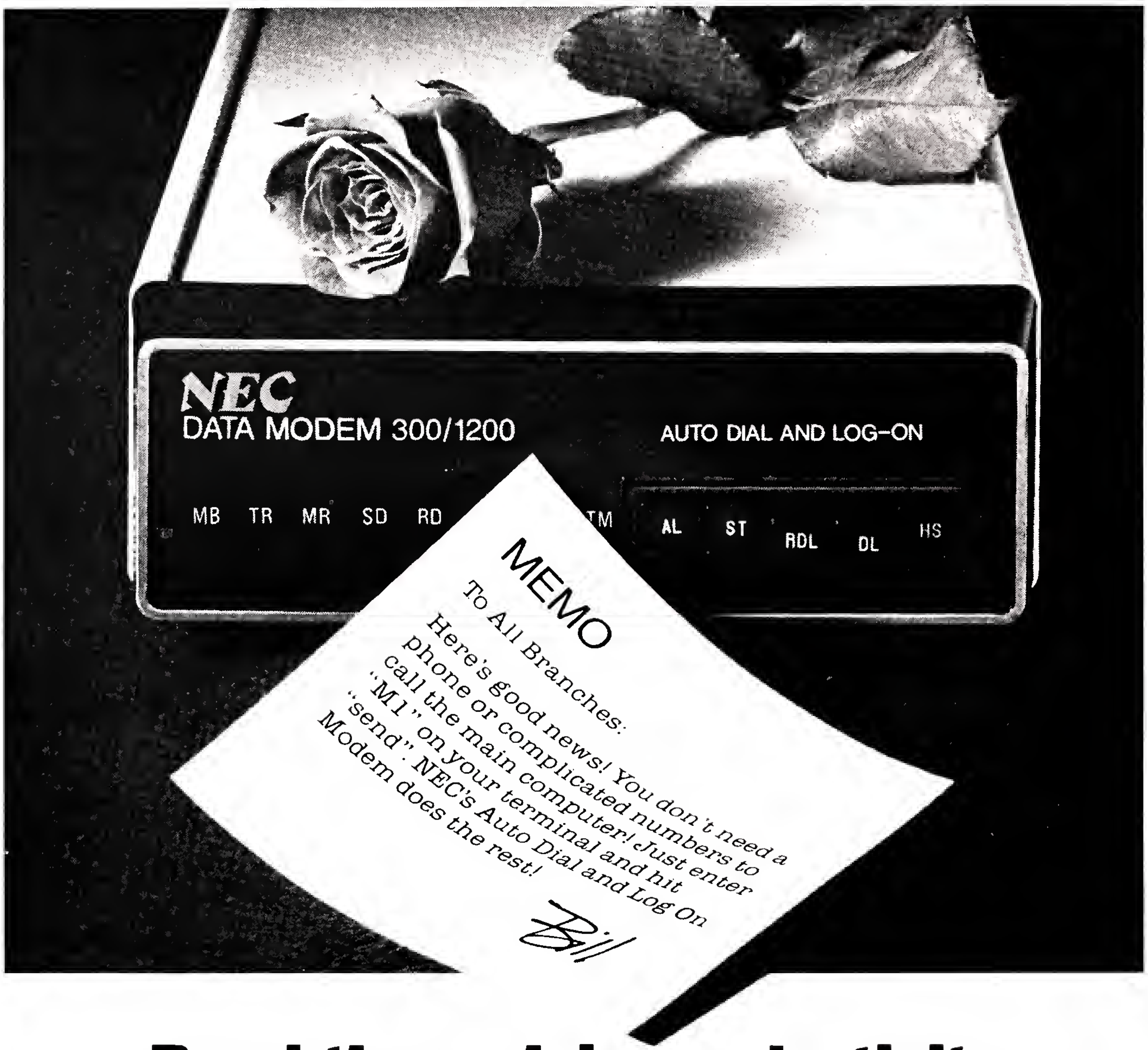
Report: Mart For Portables To Increase

SAN JOSE, Calif. — The market for portable computing devices will grow at a compound annual rate of more than 60% in shipments and 66% in revenues through 1986, according to a report now available from Creative Strategies International, Inc.

The report, *Portable Computing Devices,* concludes that annual worldwide shipments of those devices will grow from 2.2 million units in 1981 to 24.5 million units in 1986. The report also predicts that annual worldwide revenues from portable computers will increase more than 11 times to $5.3 billion during that period.

Technologies that will have a major influence on the portable computer market will include the following: Cmos memory technology; high resolution, low-cost terminals; miniaturization of mass storage techniques; and advances in applications software, according to the study. Of the four major market segments identified by the report — programmable calculators, handheld computers, portable keyboard consoles and portable computers — all but the programmable calculator segment are now open to market entry by unknown vendors.

The full report costs $1,450 from Creative Strategies, Suite 275, 4340 Stevens Creek Blvd., San Jose, Calif. 95129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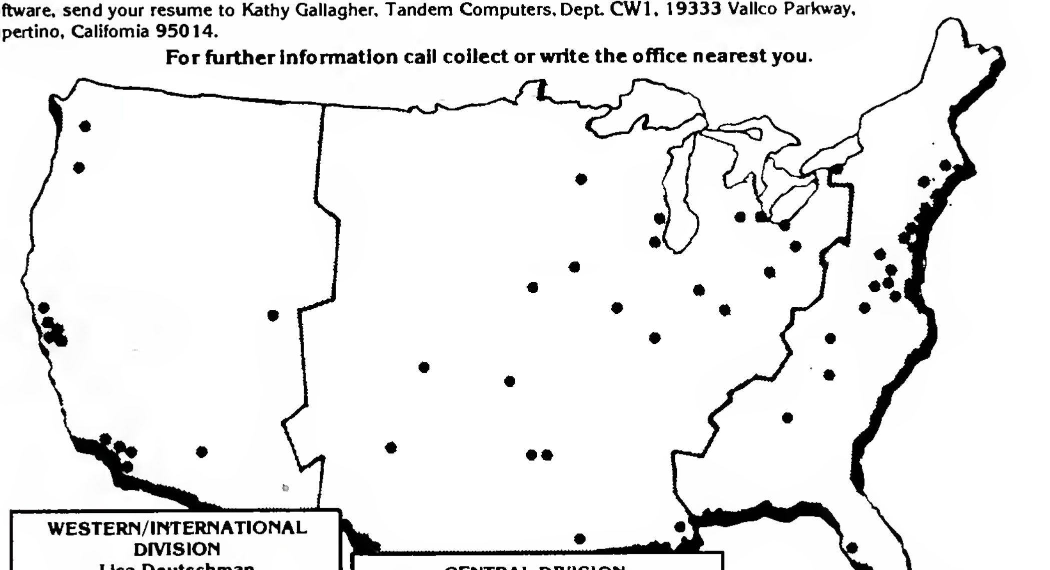

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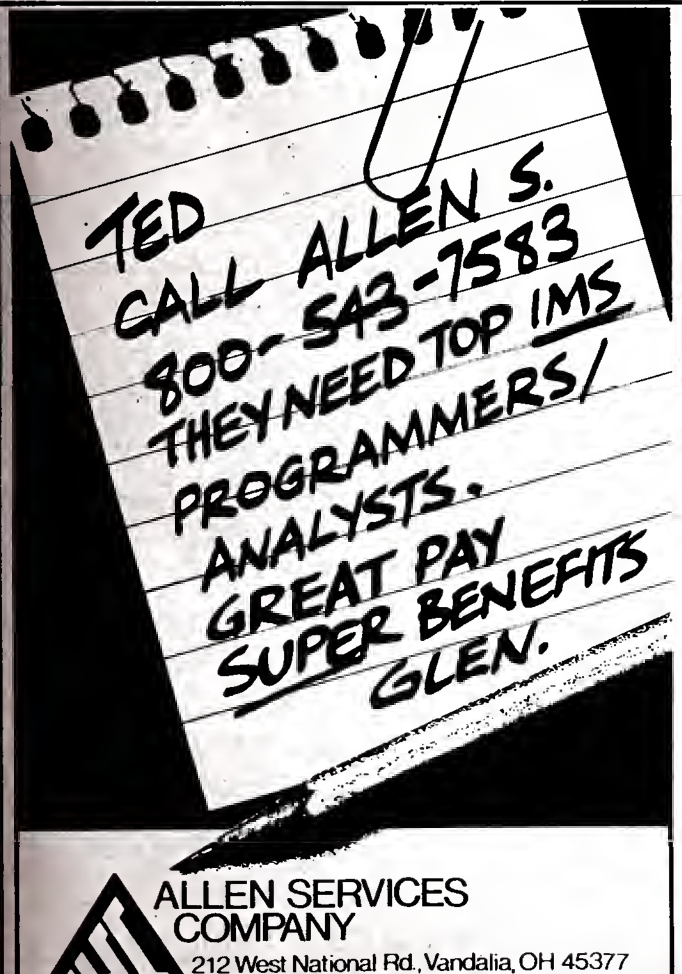

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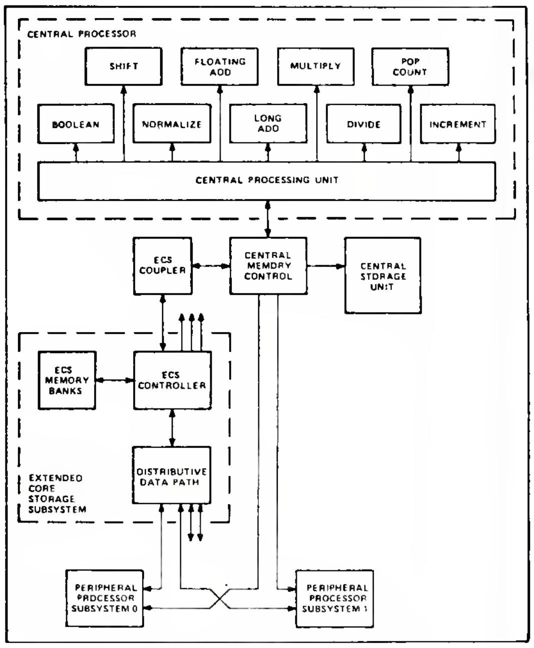

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SYSTEMS ANALYSTS

TEKTRONIX: The Graphic Standard

creative solutions for tomorrow's problems

There's an upsurge of innovation at Tektronix as we provide creative solutions for a future of change. For example, our technologically advanced 4100 Series terminals can address the most sophisticated customer problems with graphics solutions. "Human Engineering" and proven performance have made our in-demand computer graphics products prototypes for the industry. Join a stimulating, high technology environment that values and rewards each individual contribution to the team effort.

We have openings for **SYSTEMS ANALYSTS** in the following cities:

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With a college degree and extensive FORTRAN scientific applications orientation, your customer/user interface skills with mini or mainframe computers will be used in a pre- and post-sales and client support environment.

Send your resume with salary expectations TODAY, or call Ed Gadsden COLLECT (301) 948-7151. TEKTRONIX INC., DEPT. CW01, 19 Firstfield Road, Gaithersburg, MD 20878. An Equal Opportunity Employer M/F/H.

Tektronix
COMMITTED TO EXCELLENCE

PROJECT LEADER

Local Computer Network

Rush-Presbyterian-St. Luke's Medical Center, a major teaching facility in Chicago, has a key career opportunity available for a Senior-Level Software Professional to take responsibility for the development, implementation, and technical support of selected computer network projects. As our Project Leader, you will develop project plans and schedules, review and select consultants, and perform system design and analysis.

The candidate we seek will possess at least 5 years EDP experience with a strong background in the development of communications systems in either a large corporate or hospital setting. Experience with TANDEM equipment and proficiency with TAL programming language are required. A BSEE or BSCS is a definite plus.

Rush will offer the qualified candidate a highly competitive starting salary, based on experience, a generous benefit package which includes 4 weeks vacation, and the ideal opportunity to develop a rewarding career within a top-notch professional environment. For immediate and confidential consideration, please send your resume with salary history to JOHN SHORT:

RUSH
Presbyterian-St. Luke's Medical Center
1725 West Harrison Street • Chicago, IL 60612

Equal Opportunity Employer M/F

RUSH

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Responsible for conducting all phases of the data base design review for application systems including the design of logical data views, MFS screen layouts, DL/1 call patterns, physical data structures, and data models. Provides support for data base recovery reorganizations.

Qualified candidates will possess a thorough knowledge of IMS internals and 5 years experience directly supporting IMS in a data administration function. Thorough knowledge of data base utilities and space/performance monitoring software tools required.

Your expertise will be rewarded with our outstanding salary and comprehensive benefits package including relocation, stock purchase program, tuition reimbursement and fully paid medical/dental/life insurances. Call 305/593-3359 collect for an employment application, or send your resume in complete confidence to:

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Marty Anderson
Manager of Human Resources
RYDER TRUCK RENTAL, INC.
P.O. Box 520816
Miami, FL 33152

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EDP PROFESSIONALS

We're an energy company located in the heart of a sportsman's paradise in the Sunbelt. We are about to enter a major upgrading project and have challenging positions developing a full range of systems and programs. Currently, we are utilizing IBM hardware and will be installing a Hewlett Packard 3000 Model 64.

MANAGER PROGRAMMING

We need a degreed programming manager who can assist our Manager of Information Systems in planning the operations of programming development. This person also will direct the work of the programming staff. You need 5-10 years experience, preferably with an oil and gas company. You also must have a thorough knowledge of systems and programming using RPG II and COBOL.

PROGRAMMERS

Programmers with 3-5 years experience, preferably with oil and gas programs. RPG II and COBOL are necessary, degree preferred.

We offer competitive salary and benefits. Please send resume and salary history to:

Personnel Dept.

Transcontinental
Energy Corporation

P.O. Box 21568
Shreveport, LA 71120
EOE

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Informatics General Corporation, located in Phoenix, Arizona, is currently seeking a Technical Consultant to perform on-site consulting at client law firms. In this capacity you will assist legal firms to implement office automation. This challenging position requires a significant amount of travel. To qualify, you should be well versed in Wang systems hardware, software and telecommunications, with word processing experience, preferably on Wang. Requirements include a college degree, plus 5 years data processing experience (2+ years on Wang VS). Programming and law firm background is a plus.

At Informatics we offer a competitive salary and an excellent benefits package. Interested candidates please send resume today to: **Brian Ellefritz, Informatics General Corporation, Professional Software Systems Division, 200 E. Mitchell Drive, Phoenix, AZ 85012.** We are an equal opportunity employer.

informatics
general corporation

SENIOR SOFTWARE ENGINEER - Prime Computer, Inc., an industry leader in the design, manufacture, sale and service of small and medium-size general purpose digital computers and interactive computer systems, has an immediate need for a highly skilled Senior Software Engineer to measure, analyze and enhance the performance of a distributed network system, and to design and implement advanced communication architecture for a distributed network system. Minimum requirements are a Master's degree in Computer Science, Electrical Engineering or Operations Research together with at least one years relevant experience involving general network performance evaluation, the building and use of performance measurement tools, and the PRIMOS operating system. Also required is a working knowledge of simulation and analytical queueing modelling, statistics, and PL/1. Starting salary is $32,900 per year for a five day, forty-hour work week and includes medical, life and disability insurance, two weeks annual vacation and other industry-competitive benefits. Qualified applicants respond with resume only to Ms. Beverly Horan, Employee Services Representative, Human Resources Dept., Prime Computer, Inc., Prime Park, Natick, Massachusetts 01760. An Equal Opportunity Employer

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DATA PROCESSING PARTIAL LISTING

HOGAN - BANKING SYSTEMS

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PROJECT MANAGER - Mid 30's, 4 member team, Integrated Deposit System.
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SYSTEMS ANALYST - $30,000, CPCS-All Systems MVS Multi CPU's.

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PROGRAMMER ANALYST

Please Help Us!

For months we have been in daily communication with top companies in the Midwest, the South, the Southeast and the Sunbelt areas. We have numerous positions that we are trying to fill that require 2-5 years experience on IBM, Honeywell, and/or Burroughs hardware. Online and Data Base experience are pluses.

We offer a broad range of opportunities. If your present situation is not realizing your full potential or a change of climate is what you have in mind, send your resume to our central location.

EXECUTIVE RESOURCE

1010 Collingwood Dr.
Suite 105
St. Louis, MO 63132
1-800-325-4802

DP Executive Employment Service

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Sys. Prog.	DOS/VSE/CICS	$33K

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Diversified Los Angeles-Based Multi-Company Financial Institution requires highest caliber person for senior management position. Must possess exemplary skills in both verbal and written communication and be sophisticated in all of the following operational, data processing related areas:

- Budgeting
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- Evaluation of technological advances with verbal and written recommendations to executive committee as to options.
- Implement preliminary negotiations for aquisition of hardware/software enhancements.
- Recruit and manage staff.

Submit resume and salary requirements to:

CW-A3335
Computerworld
Box 880
Framingham, MA 01701

DATA PROCESSING PROFESSIONALS

The Fairbanks North Star Burrough, Fairbanks, Alaska is currently expanding its computing capabilities by converting to an IBM 4300 computer and replacing major software elements. We are seeking data processing professionals in the following areas and offer competitive salary and fringe benefits program plus limited relocation assistance.

SYSTEMS PROGRAMMER

Reporting directly to the Director of Data Processing . Responsible for management of DOS/VSE operating system, supporting CICS telecommunications activity, and providing technical support to development. System programming experience required, in IBM DOS/VSE, CICS, VSAM, BTAM, and VTAM. Applicants should have a minimum of five years of data processing experience, one year of which must have been as a Systems Programmer.

PROGRAMMER

Responsibilities include analyzing, designing, and implementing new system and enhancing existing systems. Applicants should have a minimum of one year in Cobol programming experience plus two years appropriate college background or applicable technical training. Experience with CICS and/or RPG under DOS/VSE will be considered a definite plus.

Interested candidates should forward resume and salary history to:

The Personnel Division
P.O. Box 1267
Fairbanks, AL 99707
Prior to October 11, 1982
An Equal Opportunity Employer

Data Processing

PROGRAMMERS PROGRAMMERS/ANALYSTS

A major manufacturer of consumer electronics seeks data processing professionals to program on IBM System 38 hardware. Ideal candidate must have System 38 experience with RPG III. System III, model 15D acceptable in lieu of 38 experience. Several years experience required in an industrial manufacturing environment.

We offer a comprehensive benefits package which includes full medical insurance and relocation benefits. For immediate consideration, send resume detailing salary history and requirements. Only those resumes detailing salary history and requirements will be considered.

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SANYO MANUFACTURING CORPORATION
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What you've waited for?

SYSTEMS PROGRAMMER

Enjoy "A Job Without Walls" in An Exceptionally Desirable Organizational Setting

The responsibilities of this assignment do not fall easily into any slot--which may make it exactly what you have been hoping to find, someday. To begin with, it is with ETS, long a leader in the specialized, growing, and important field of testing, advisory, and research activities for education, government and business. A private, nonprofit, prestigious organization, ETS has superb facilities on a large, wooded tract near Princeton, New Jersey.

Your duties will be many and varied, as you consult with many users, analyze needs, and apply diverse programming concepts and design systems for complex projects. You may be called on to manage, or to plan and organize, to act as Chief Programmer for a team, to help develop proposals, to review information processing methods and equipment in use and evaluate or suggest improvements. In short, your skills will be utilized to the full in a succession of efforts, growing and maturing with this kind of experience and exposure.

We presently have an inviting "hands on" opportunity for a senior staff member working with

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Requires in-depth knowledge of system internals, maintenance, generation and debugging of operating systems, or analytical ability in computer measurement and evaluation. An active working knowledge of Assembler and a higher level language (preferably COBOL) is required.

BASIC REQUIREMENTS. The requirements are implicit. You should have a good grasp of large scale hardware, structured systems, data base, and the personality and depth to be effective in leadership, interfacing with users, and training.

Salaries are competitive, particularly in relation to living costs in a beautiful area convenient to both Philadelphia and New York. Benefits are distinctly exceptional and difficult to equal in total coverage and value. Vacation, for one example, begins at 4 weeks. Relocation will be assisted where required. On all counts, you may find ETS can offer an extraordinarily desirable career prospect. A serious commitment to affirmative action invites inquires from females and minority persons. Please send resume, providing adequate information, in confidence to: Ms Sandy De Angelo, Placement Specialist.

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OATA PROCESSING OPPORTUNITIES IN SOUTHERN FLORIOA

Suave Shoe Corporation (NYSE SuavSh), considered a leader in manufacturing of athletic footwear has immediate openings for experienced data processing professionals.

SYSTEMS ANALYST (2)

Successful candidates must possess requirements definition, design and implementation experience in a manufacturing environment. COBOL, CICS, and DL/I experience a must. COPICS implementation experience a sure plus.

SYSTEMS PROGRAMMER

Successful candidate must possess DOS/VSE, CICS, DL/I and VSAM experience. DBA experience a plus.

For immediate consideration please call collect or send resume with salary requirements to:

Carlos Alvarado, V.P., MIS
(305)822-7880

SUAVE SHOE CORPORATION
14100 NW 60th Ave.
Miami Lakes, Fl 33014
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OIRECTOR INFORMATION MANAGEMENT SYSTEMS

Opening available for Director, Information Management Systems who will: develop a hospitalwide information management policy in liaison with advisory body, coordinate planning and provision of data management services, define data elements, design security and integrity controls to secure the data base. This position reports to the Executive Vice President. Minimum B.S. or equivalent technical discipline with M.S. preferred, 5-7 experience in information services, with 3-5 years at management level. Healthcare experience desirable. We are a 228 bed general acute care hospital and a member of the Sisters of Mercy Health Corporation. Write or call collect to:

Leila Hospital & Health Center
Sue Collister
300 North Ave
Eattle Creek, MI 49016
(616)962-1878

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Extraordinary opportunity for top notch Programmer/Analyst. Fortran, HP-3000, Image experience required. Permanent position with expanding and well established small firm offering excellent package of fringe benefits including hospitalization, major medical, paid vacations and holidays and generous pension plan. Salary based on ability and experience. **Call H. Nichols, (305) 563-9000 or send resume to: The Institute for Econometric Reseerch, 3471 N. Federel Hwy., Fort Lauderdele, FL 33306.**

PROGRAMMER. In charge of design & development, structuring & coding of programs for applications relating to financial & telecommunication systems. H.S. diploma or equiv. Must have knowledge of ASSEMBLER. 2 yrs or 2 yrs in programming. $25,000 p.a. to work 40 hrs/5 days/wk. **PLEASE SEND RESUMES: Wrightson Hedge Management. 20 Exchange Pl. Ste 5500 NY, 10005**

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B.S. in Computer Science or Meth required. 3 to 5 years experience in Fortran, Cobol, or SPSS required. Experience with DEC-VAX 11/750 preferred. Experience with graphics software and hardware desirable. Duties: Applications programming, provide assistance to faculty end students with computer related research and computer assisted instruction. Salary: Approximately $23,000.

Send letter of application, resume, three (3) letters of reference, and transcripts by OCTOBER 8, 1982, to:

Personnel Office
WESTFIELD STATE COLLEGE
Westfield, MA 01086

AN AFFIRMATIVE ACTION/EOUAL OPPORTUNITY/HANDICAPPED/TITLE IX EMPLOYER.

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A Multi-Bank Holding Company in Central Virginia with over 700 million in assets seeks a manager of systems and programming to direct staff of 10. Minimum of 5 years experience with NCR equipment in a CIF and FOCUS environment. Prior management background required. Salary commensurate with experience.

Contact Kon Boyd
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(804) 973-4487
EOE

SYSTEMS ANALYST FOR DATA BASE

New Mexico State University is seeking a Systems Analyst for the Administrative Data Processing organization. Candidates should have a minimum of four years of computing experience; it is desirable that candidates have some experience with inverted date base system software. B.S. in related field desirable. Salary: $24,000-$30,000. Liberal fringe benefits including 22 days ennual leave per year. NMSU has excellent computer related degree programs. NMSU has a large Computer Center with two major computers, an Amdahl 470 V/5 and V/6. It is an MVS/JES 3 environment with VM/CMS for interactive services. Almost all administrative systems On/Line. Interested candidates send resume to: **Dr. Joseph R. Denk, Director of Computer Center, Box 3AT, New Mexico State University, Las Cruces, N.M. 88003.** Deadline for applications is October 15, 1982.

NMSU IS AN EOUAL OPPORTUNITY/
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PDP/VAX DATA PROCESSING MANAGER LONG ISLAND

Responsibilities: Development of business systems utilizing PDP 11/70 and VAX 11/780.
Requirements: 3 plus years inventory and financial systems design experience with a working knowledge of RSTS/E or VMS and BASIC programming required.
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Computerworld will be distributing the October 11, 1982 issue from our booth. In order to take advantage of this increased distribution reserve space now.

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COMPUTERWORLD
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SAUDI ARABIA

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Training Manager

Manage EDP instructors for Saudi Arabian users. Responsible for management of trainers, involved in instruction of computerized information systems. Based in SAUDI ARABIA. Arabic fluency not required. Degree necessary.

DP User Instructors

Experience in COBOL programming using large-scale VM/SP, IBM, OS/MVS, CICS, TP software in a distributed EDP environment. Applicants should have 1-2 yrs. training/instruction background in DP. ARABIC/ENGLISH BILINGUAL VERBAL AND WRITTEN SKILLS REQUIRED. USA or KSA citizenship required due to Visa restrictions.

We offer such benefits as medical, life, ADD, disability, profit sharing, 5 day work week, overseas premium. While based in Saudi Arabia, you will additionally receive 30 working days vacation, 15 holidays, free furnished family housing, free children's education, annual return home travel, paid relocation expenses plus eligibility for new liberal tax exclusions just recently passed.

Saudi Arabia positions are family status and require a 1 yr. commitment in Saudi Arabia for the SYSOREX staff. Please send resume to Personnel, SYSOREX INTERNATIONAL, INC. 10590 N. Tantau Ave., Cupertino, CA 95014. (408) 996-9363. INDIVIDUALS ONLY APPLY.

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For prompt and confidential response, please send resume to:

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Naked Mini Division (NMO) is a leading manufacturer, designer and supplier of minicomputer products to Original Equipment Manufacturers and major end users.

NMD's products range from low end small business systems OMNIX and WORKSTATION to CARTOS, a real-time development system. Both feature multiuser and multitasking capabilities.

The following positions are available immediately.

SALES REPRESENTATIVES (OEM)

2-5 years experience and BSEE or equivalent degree required.

Openings in Dallas, Pittsburgh, Philadelphia, and New Jersey.

SALES SUPPORT

2 years or more experience programming minicomputers and BSEE or BSCS degree required.

Openings in Chicago.

Ask for Nate Simmons, Ext. 515

COMMERCIAL SYSTEMS DIVISION

Commercial Systems Division (CSD) is a supplier of proven high performance data processing systems to major end users.

The division recently announced a new system featuring advanced networking capabilities and a micro-computer workstation that will serve as a growth path for current products and will open new marketing opportunities.

The following positions are available immediately.

SALES REPRESENTATIVE (DP)

2-5 years experience.

Openings in No. California, So. California, Atlanta, Houston, Dallas, New York, and New Jersey.

SALES SUPPORT

2 years or more experience programming minicomputers and four year degree required.

Openings in No. California, So. California, Atlanta, Houston, Dallas, New York, and New Jersey.

Ask for Kathleen Jenkins, Ext 574.

INDUSTRIAL PRODUCTS DIVISION

Industrial Products Division (IPD) is a major supplier ot Automatic Test Equipment.

IPD's MARATHON TEST SYSTEM is leading the way to the factor ot the tuture. MARATHON features in-circuit and function testing, test programming aid as well as, data collection a distribution capabilities.

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2-5 years experience and BSEE or equivalent degree required.

Openings in Florida, Texas, and New England.

SALES SUPPORT

2 years or more experience programming minicomputers and
BSEE or BSCS degree required.

Openings in New England.

Ask for Nate Simmons, Ext. 515

For immediate consideration call (714) 833-8830 or send resume.

**Computer Automation, Inc.
2181 DuPont Drive, Department G-350
Irvine, CA 92713**

Equal Opportunity Employer

ASSOCIATE DIRECTOR - COMPUTER CENTER
THE OHIO STATE UNIVERSITY

The Ohio Stete University requires an individual to plan and direct the Development Section ol the University Systems computer center which consists ol approximately 50 professional staff. The Associate Director will be responsible to identify, develop, recommend and implement administrative data systems, functions and methods. This individual will assist the University mangement with the development of long and short range systems planning as well as establishing and implementing projects, policies and procedures. A demonstrated ability to work with diverse University groups is essential. Additional duties include productive study and preparation of special reports relative to data processing plans, projects, performance, budgets and related metters. The total University System annual budget exceeds five million dollars.
Candidetas are required to have a bachelor's degree in computer science, industrial engineering or related field or an equivalent combination ot education and experience. Progressively responsible experience in computer center management or user-oriented systems development is also required. Networking of micro, mini and mainframe systems with user emphesis is highly desirable. Salary renge: $35,000 to $40,000. Position available immediately. Letter of interest with supporting materiels must be received by October 11, 1982 and should be adressed to: Professional Employment Services, Archer House Lobby, 2130 Neil Ave., Columbus, OH 43210.

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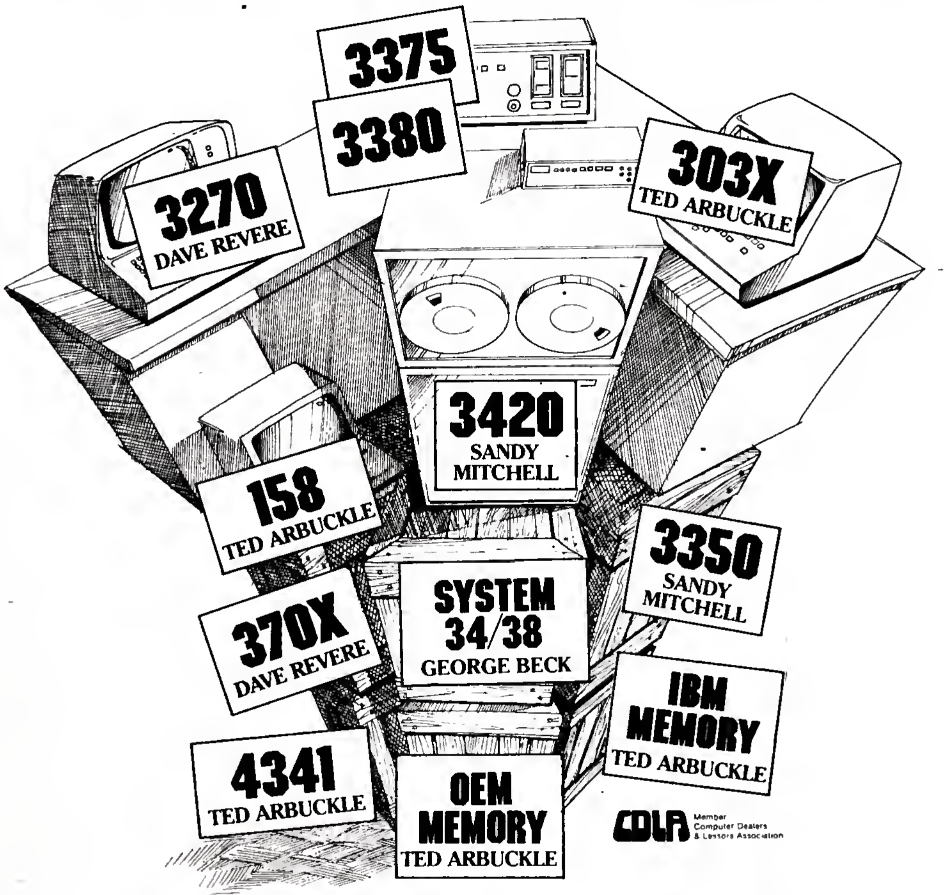

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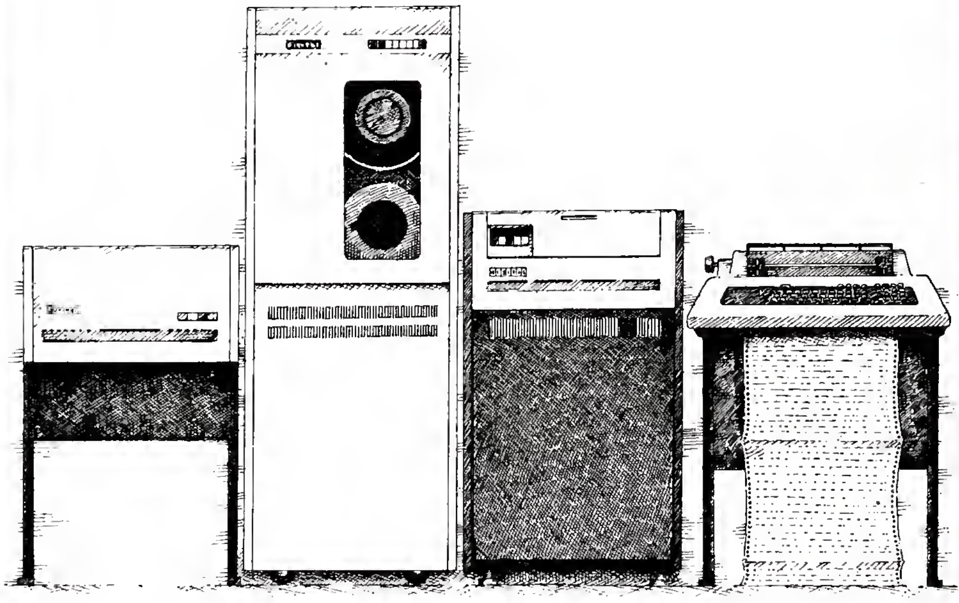

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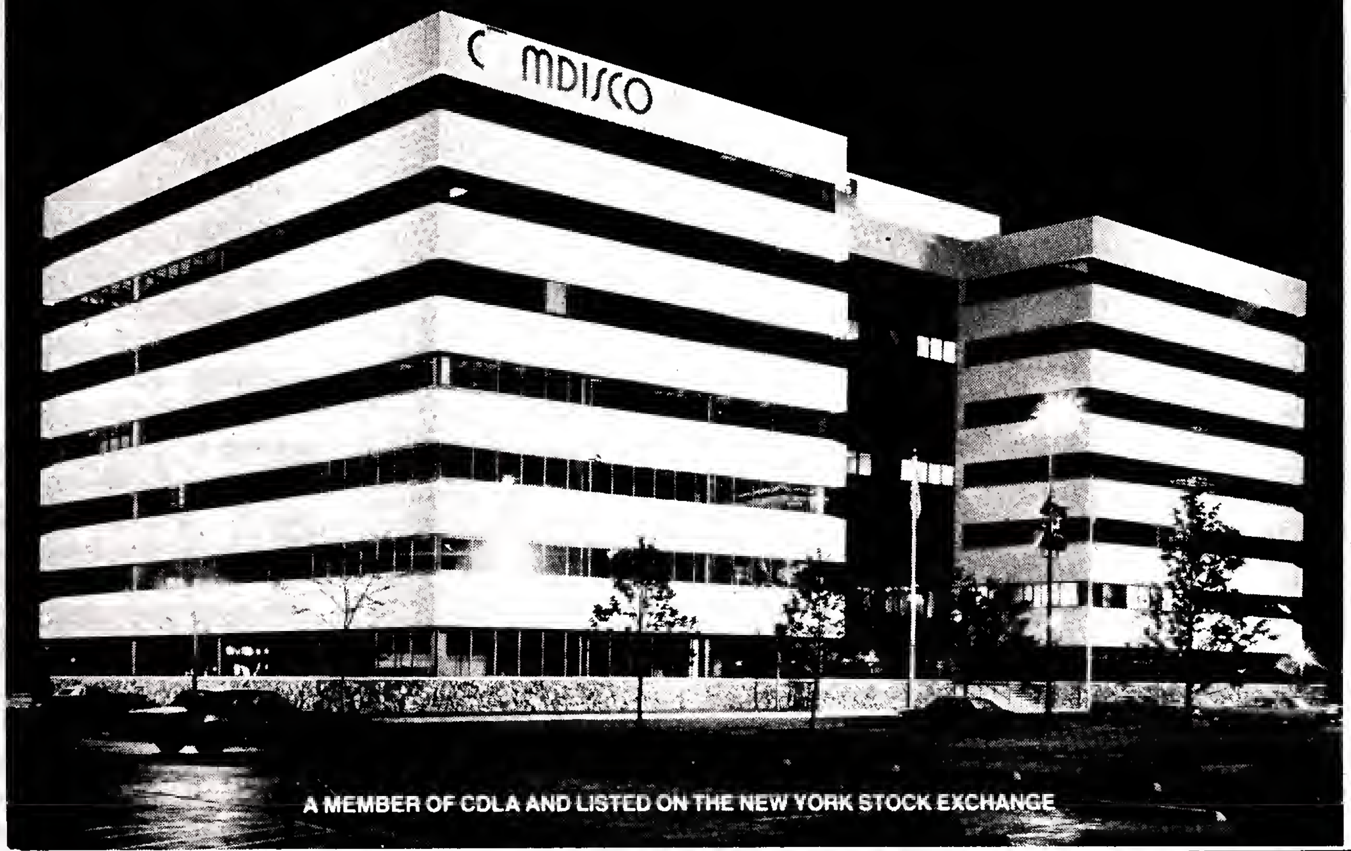

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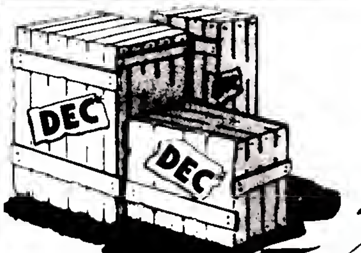

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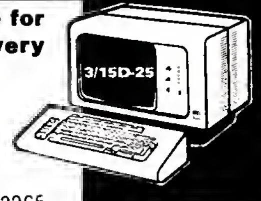

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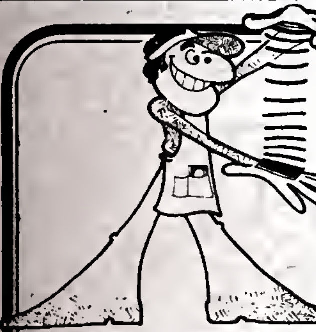

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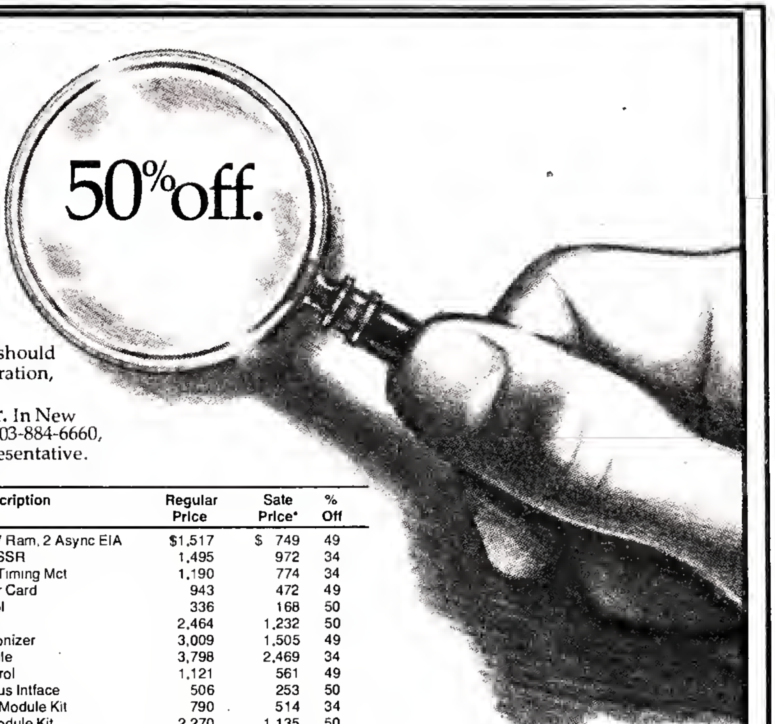

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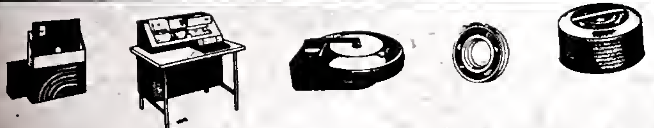

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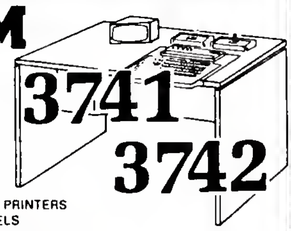

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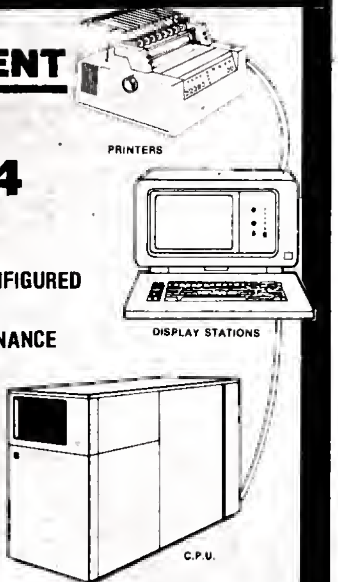

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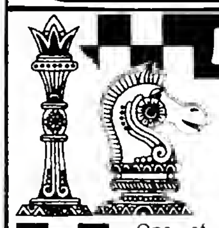

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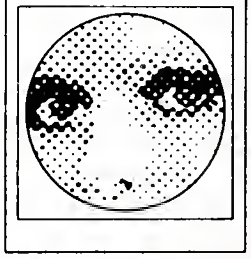

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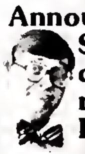

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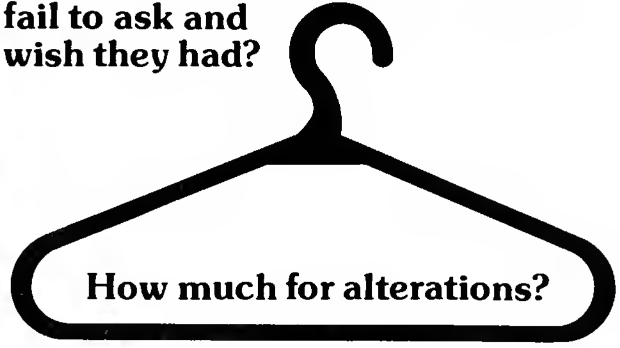
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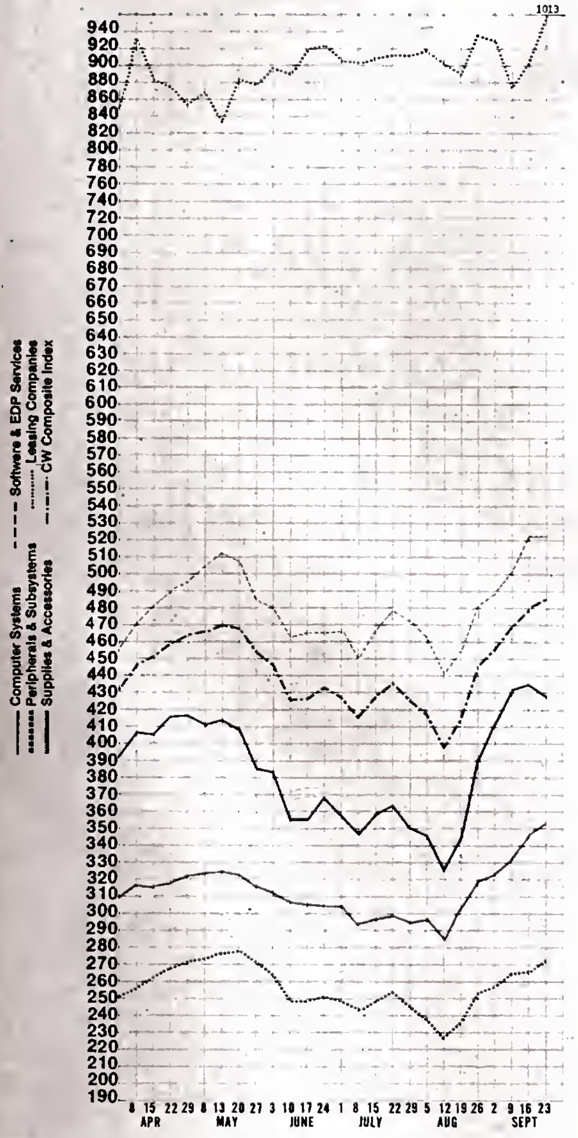

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CLOSING PRICES WEDNESDAY, SEPTEMBER 22, 1982

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COMPUTER SYSTEMS

EXCH		PRICE 1981-82 RANGE (1)	CLOSE SEP 22 1982	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	18- 46	27 1/8	- 5/8	-2.2
N	BURROUGHS CORP	28- 72	35 5/8	-2 1/8	-5.6
O	COMPUTER AUTOMATION	8- 28	10	- 3/8	-3.6
N	CONTROL DATA CORP	19- 42	29 3/4	-1 7/8	-5.9
N	CRAY RESEARCH INC	20- 49	24 1/2	- 1/8	-0.5
N	DATA GENERAL CORP	21- 87	26 3/8	-1 3/8	-4.9
N	DATAPOINT CORP	11- 68	14 3/4	-1 1/4	-7.8
N	DIGITAL EQUIPMENT	62-113	85 1/2	-1 1/4	-1.4
A	EECO INC	6- 19	8 3/4	- 3/8	-4.1
N	ELECTRONIC ASSOC.	5- 13	9 5/8	- 1/2	-4.9
N	FLOATING POINT SYST	13- 30	27 3/8	+2 5/8	+10.6
N	FOXBORO	22- 62	31 5/8	- 3/8	-1.1
O	FULCRUM COMP GRP	1- 3	1/4	0	0.0
O	GENERAL AUTOMATION	3- 16	3 5/8	- 1/8	-3.3
N	HARRIS CORP	21- 60	35	+3 1/2	+11.1
N	HEWLETT-PACKARD CO	33- 55	54 5/8	+ 1/4	+0.4
N	HONEYWELL INC	60-115	83 5/8	- 1/4	-0.2
N	IBM	49- 77	75 1/2	+2 1/8	+2.8
O	IPL SYSTEMS INC	5- 13	6	0	0.0
O	MAGNUSON COMP SYSTS	2- 32	1 7/8	0	0.0
N	MANAGEMENT ASSIST	7- 26	9 3/8	-1	-9.6
O	MINI-COMPUTER SYST	0- 4	3/8	0	0.0
N	MODULAR COMPUTER SYS	7- 32	9 7/8	+ 5/8	+6.7
N	MOHAWK DATA SCI	10- 32	14 5/8	-1	-6.3
N	NCR	39- 76	65 1/8	-2 1/4	-3.3
N	PERKIN-ELMER	17- 36	23 5/8	+1	+4.4
N	PRIME COMPUTER INC	16- 49	25 1/2	-1 7/8	-6.8
N	SPERRY CORP	21- 65	24 1/8	- 1/4	-1.0
O	TANDEM COMPUTERS INC	13- 35	23 3/4	- 1/4	-1.0
N	TEXAS INSTRUMENTS	71-151	98	-2 3/4	-2.7
A	WANG LABS "B"	24- 39	38	- 3/8	-0.9
A	WANG LABS "C"	21- 40	38 1/2	-1 1/4	-3.1

LEASING COMPANIES

EXCH		PRICE 1981-82 RANGE (1)	CLOSE SEP 22 1982	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE FINANCIAL CP	18- 29	23 1/2	+1	+4.4
N	COMDISCO INC	15- 27	22	+ 1/8	+0.5
B	COMMERCE GROUP CORP	1- 1	1/2	0	0.0
O	COMPUTER INVSTRS GRP	1- 2	1/4	+ 1/8	+100.0
O	CONTINENTAL INFO SYS	4- 10	10 1/4	+ 1/4	+2.5
N	DPF INC	5- 13	10 1/2	+ 1/4	+2.4
O	ITEL	1- 5	5/8	0	0.0
O	LEASPAC CORP	1- 2	1/8	0	0.0
N	U.S. LEASING	18- 30	28 1/4	+ 1/4	+0.8

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SOFTWARE & EDP SERVICES

EXCH		PRICE 1981-82 RANGE (1)	CLOSE SEP 22 1982	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 6	1 3/4	0	0.0
O	ADVANCED SYSTEMS INC	9- 15	11 1/2	0	0.0
O	AGS COMPUTERS INC	7- 10	9 1/4	- 1/2	-5.1
O	ANACOMP INC	10- 19	10 3/8	+ 3/4	+7.7
O	ANALYSTS INTL CORP	3- 14	6	-1 3/4	-22.5
A	APPLIED DATA RCS.	13- 29	28 1/8	- 1/9	-0.4
O	ASK COMPUTER SYSTEMS	11- 18	17 7/8	- 1/4	-1.3
B	ASTRADYNE COMP IND	1- 5	1 1/4	0	0.0
N	AUTOMATIC DATA PROC	21- 32	23 7/8	-2 3/8	-9.0
O	CGA COMPUTER ASSOC	4- 25	5 3/4	- 1/4	-4.1
O	COMPUTER ASSOC INT'L	12- 26	24 1/2	+ 1/4	+1.0
O	COMPUTER HORIZONS	1- 3	2	- 1/4	-11.1
O	COMPUTER NETWORK	4- 9	7 1/4	+ 3/8	+5.4
N	COMPUTER SCIENCES	11- 30	15 5/8	+ 1/8	+0.8
O	COMPUTER TASK GROUP	9- 23	9 3/4	+ 1/2	+5.4
O	COMPUTER USAGE	2- 10	2 3/8	- 1/4	-9.5
O	COMPUTONE SYSTEMS	12- 23	22 1/2	+2 1/8	+10.4
O	COMSERV CORP	9- 16	15	+ 1/4	+1.6
O	COMSHARE	6- 21	5 3/4	- 1/8	-2.1
N	CULLINANE DATABASE	15- 41	41	+2 1/8	+5.4
O	CYCARE SYSTEMS INC	9- 14	11	+ 1/4	+2.3
O	DATA DIMENSIONS INC	1- 3	1/4	0	0.0
O	DATATAB	1- 4	5/8	+	+10.0
O	DYATRON CORP	2- 11	3 1/4	+ 1/8	+4.0
N	ELECTRONIC DATA SYST	15- 35	34	0	0.0
O	INFORMATICS INC	10- 23	15 3/8	- 1/2	-3.1
O	INSYTE CORP	1- 3	1 5/8	- 1/4	-13.3
O	IPS COMPUTER MARKET.	1- 2	1 1/8	0	0.0
O	KEANE ASSOCIATES	4- 8	4 1/2	+ 1/2	+12.5
A	LOGICON	12- 38	18 5/8	+ 5/8	+3.4
O	MNGT SCI AMER INC	17- 27	26 1/2	0	0.0
O	MATHEMATICA INC	8- 17	15 1/4	0	0.0
O	MATHEMATICAL APP GRP	12- 28	12 1/2	0	0.0
O	NATIONAL DATA CORP	13- 28	18 7/8	- 3/8	-1.9
O	PANSOPHIC SYSTEMS	8- 15	14 1/2	+1 1/2	+11.5
N	PLANNING RESEARCH	5- 13	8 1/4	- 1/4	-2.9
O	PROGRAMMING & SYS	1- 2	1 1/4	0	0.0
O	REYNOLDS & REYNOLDS	16- 26	23	-1 1/2	-6.1
O	SEI CORP	17- 28	28	+1 1/2	+5.6
O	SHARED MEDICAL SYST	26- 39	38 1/4	- 1/8	-0.3
O	SCIENTIFIC COMPUTERS	6- 16	9 1/4	+ 1/4	+2.7
O	SOFTWARE AG	5- 23	8 1/8	+ 3/8	+4.8
N	TYMSHARE INC	13- 58	20 3/4	+ 5/8	+3.1
A	URS CORP	10- 18	11 1/4	- 1/8	-1.0
N	WYLY CORP	7- 20	10 1/2	- 3/8	-3.4

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1981-82 RANGE (1)	CLOSE SEP 22 1982	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTERNATIONAL	1- 15	3/4	0	0.0
A	ANDERSON JACOBSON	9- 26	13 3/4	+2 3/4	+25.0
O	AUTO-TROL TECHNOLOGY	8- 62	12 5/8	+ 3/8	+3.0
O	BANCTEC INC	7- 35	11 3/4	+ 1/4	+2.1
A	BEEHIVE INT'L	4- 18	4 5/8	- 1/4	-5.1
A	BOLT,BERANEK & NEW	9- 25	22 3/4	+5 5/8	+32.8
O	CAMBEX CORP	2- 9	2 1/2	+ 1/8	+5.2
N	CENTRONICS DATA COMP	7- 40	8 3/4	+ 1/2	+6.0
A	CETEC CORP	4- 9	4 1/2	0	0.0
O	COGNITRONICS	2- 11	4 3/8	0	0.0
O	COMPUTER COMMUN.	1- 2	5/8	0	0.0
A	COMPUTER CONSOLES	16- 28	23 1/2	- 7/8	-3.5
O	COMPUTER DEVICES INC	4- 12	12 1/8	+ 3/8	+3.1
O	COMPUTER TRANSCEIVER	3- 9	4 1/4	0	0.0
N	COMPUTERVISION CORP	20- 49	23 7/8	-1 7/8	-7.2
N	CONRAC CORP	17- 28	26 1/2	+ 1/4	+0.9
A	DATA ACCESS SYSTEMS	2- 15	2	+ 1/4	+14.2
A	DATAPRODUCTS CORP	16- 44	23 1/2	-1	-4.0
O	DATARAM CORP	4- 15	6 1/2	+ 1/4	+4.0
O	DATUM INC	2- 5	2 1/8	+ 1/4	+13.3
O	DAVID JAMISON CARLYL	2- 7	2 7/8	+ 1/8	+4.5
O	DECISION DATA COMPUT	3- 6	5 1/2	+ 1/8	+2.3
O	DELTA DATA SYSTEMS	1- 4	1 1/8	0	0.0
N	ELECTRONIC M & M	3- 9	4 1/8	- 1/8	-2.9
O	EVANS & SUTHERLAND	18- 40	28 1/2	+1 1/4	+4.5
O	GANDALF TECHNOLOGIES	10- 15	13 5/8	+ 5/8	+4.8
N	GEN'L DATA COMM IND	7- 19	10 3/8	- 1/4	-2.3
O	GENERAL TERMINAL CP	0- 4	1/4	0	0.0
O	GREAT SOUTHWEST IND	1- 12	3	0	0.0
N	HAZELTINE CORP	19- 35	30	+1 5/8	+5.7
O	ICOT CORP	3- 4	2 7/8	-	-2.0
O	INFORMATION INTL INC	8- 17	14 1/4	-1 3/4	-10.9
O	INTEL CORP	21- 51	34 1/4	- 1/2	-1.4
O	IPL SYSTEMS INC	5- 15	6	0	0.0
A	LUNDY ELECTRONICS	7- 18	10	- 7/8	-8.0
A	MSI DATA CORP	11- 27	18 1/8	-1	-5.2
O	NETWORK SYSTEMS CORP	14- 26	24	-1	-4.0
O	OMEX	3- 8	3	0	0.0
N	PARADYNE CORP	24- 52	36 1/4	- 1/4	-0.6
A	PENRIL CORP	7- 17	10	0	0.0
O	RAMTEK CORP	9- 23	16 1/4	+1 1/2	+10.1
N	RECOGNITION EQUIP	4- 21	6 5/8	+ 1/2	+8.1
O	SCAN DATA	1- 5	1 1/4	0	0.0
N	STORAGE TECHNOLOGY	16- 40	20	+ 3/8	+1.9
O	SYKES DATATRONICS	6- 34	6 1/2	-1	-13.3
A	T BAR INC	7- 19	8 1/8	- 1/8	-1.5
A	TIE INC	4- 11	8 1/2	- 1/4	-2.8
N	TEKTRONIX INC	26- 70	43 1/2	+ 3/4	+1.7
N	TELEX	5- 11	10 3/4	0	0.0
O	TESDATA SYSTEMS CP	3- 17	4	+ 3/8	+10.3
A	TIMEPLEX INC	7- 19	10 7/8	- 5/8	-5.4
O	VISUAL TECHNOLOGY	9- 15	12	- 1/2	-4.0
O	WILTEK INC	1- 3	1 1/4	+ 1/8	+11.1

SUPPLIES & ACCESSORIES

EXCH		PRICE 1981-82 RANGE (1)	CLOSE SEP 22 1982	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN BUS PRODS	11- 17	16 1/4	+1 7/8	+13.0
O	BALTIMORE BUS FORMS	1- 2	1	0	0.0
N	BARRY WRIGHT	14- 24	18 1/4	+ 3/8	+2.0
O	CYBERMATICS INC	1- 2	1	0	0.0
A	DUPLEX PRODUCTS INC	12- 17	16	- 1/8	-0.7
N	ENNIS BUS. FORMS	15- 26	25	- 1/4	-0.9
N	3M COMPANY	48- 68	65 5/8	+1	+1.5
O	MOORE CORP LTD	26- 38	34 3/8	+1 1/4	+3.7
N	NASHUA CORP	9- 33	10 1/8	- 1/2	-4.7
O	STANDARD REGISTER	30- 55	53 1/2	+ 1/2	+0.9
A	TAB PRODUCTS CO	12- 20	17	+1 1/2	+9.6
N	WALLACE BUS FORMS	22- 38	37 3/4	+ 1/2	+1.3

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